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SMALL HOUSES

THEIR ECONOMIC DESIGN AND CONSTRUCTION

SMALL HOUSES

THEIR ECONOMIC DESIGN AND CONSTRUCTION

ESSAYS ON THE FUNDAMENTAL PRINCIPLES OF DESIGN
AND DESCRIPTIVE ARTICLES ON CONSTRUCTION

BY

ERNEST FLAGG

ARCHITECT



WITH PLATES

DRAWN BY THE AUTHOR ILLUSTRATING METHODS AND RESULTS

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P R E F A C E

THOSE who object to new methods simply because they are not accustomed to them will have little use for this book. Pope says:

“Be not the first by whom the new is tried,
Nor yet the last the old to lay aside.”

But if progress is to be made, some one must blaze the way. It is said that Mr. Edison claims no special talent except that for making innumerable trials.

To try ways which seem better has always had a fascination for the author, and many discoveries have resulted, to his comfort, convenience and profit.

Men are for the most part creatures of habit who follow custom without question. When one does make inquiry he sees many of the commonest things of daily life done in ways which are not the best. It is not surprising, therefore, to find methods used in design and construction which can be improved upon.

Some may not see why essays on art find place in this book. Yet its object is to teach both to design and build. These little houses depend not at all on ornament. They are practically devoid of it. Their details are of the simplest and all alike; also the strictest economy reigns throughout. Nevertheless, if the author may believe what is told him, to most people they are attractive. An analysis of the cause of this will show that they please because in outline and mass they conform to the principles which it is the object of the essays to explain. Where those principles are applied to design, the result is automatically good. Like beacons at either side of the course, the correct rules of art or laws of good taste show the designer where he may go with safety and where he must not go.

The author wishes to make grateful acknowledgment to his daughter Betsy for the charming little people (by her) which embellish his drawings.

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INTRODUCTION

THE object of this work is to improve the design and construction of small houses while reducing their cost.

The most perfectly constructed object in nature, and also the most beautiful object in nature, is the human form as it approaches perfection. This, then, is the criterion of construction as it is of design. The study of its beauties is the veritable key to art, as the example of Greece shows.

In the finest specimens of the human form, it is the construction which is beautiful. In it design and construction are so blended that the two are one. As architecture approaches this condition, it excels; as it recedes from it, it fails.

In the human form, as nature tries to make it, every feature is useful and every feature is beautiful. Each member is perfectly adapted to the function it has to perform; nothing is superfluous, yet the whole and every part is supremely decorative. The best Grecian architecture most nearly approaches this ideal. Gothic architecture, too, though not so exquisitely refined, has the same principle for its basis.

It is clearly apparent that in building the best results should accrue in proportion as every element in the structure is fitted both to the function it has to perform and the materials of which it is made.

It follows from this that disguise and complication are hindrances, both to good construction and good design, and as complication and disguise are expensive and wasteful, that the interests of good art and true economy run on parallel lines.

It is hard to change long-established building habits; such habits sometimes endure for ages in certain localities with little or no change. It is, however, easy for new communities to acquire bad building habits. When the necessity for shelter is great and the means of obtaining it scant, flimsy and makeshift methods of building find ready acceptance; and once introduced are hard to eradicate. Such habits, formed here in early times, still influence construction; as is abundantly proved by our inordinate fire loss; fully ten times greater than where building is done with a little more care.

While it is not hard to suggest improvements on common methods of design and construction, it is very hard to introduce them. Any one who gives intelligent study to the subject can hardly fail to be struck by the vast amount of misdirected effort and waste which there is, on every hand, in building. He can easily see how many things might be improved. If he travels and closely observes, he will find in almost every country, and sometimes in different sections of the same country, special features or ways of building peculiar to that place. Sometimes those methods or devices are good and might with advantage be used elsewhere; he may obtain hints from old methods, once much esteemed, but now fallen into disuse; he may also exert his own ingenuity and invent new processes better than the common. If he does all this, he may perhaps reduce costs and improve design, but unless he is prepared to try his new theories and processes on himself, as has been done here, there is little likelihood that he will ever see them applied, for he will find that, of all people, builders are most set in their ways and hardest to move from their accustomed ruts.

These houses are intended to have stone walls.

Until quite recently, wood, in this country, has been abundant and cheap. It was natural, therefore, that great use should have

been made of it. Stone for ordinary houses, except in certain limited areas, has been little used, chiefly because of its supposed greater cost. The fact that a stone house is better in many ways than a wooden one, and also more economical in the long run has, for the most part, been overlooked because of the greater initial outlay.

Now, wood is daily becoming scarcer and more expensive, while new and more economical ways of using stone may be applied. The conditions are, therefore, ripe for a change from wood to stone or other incombustible material, but it will doubtless come about slowly.

The theory for the use of stone in these houses is: that low walls are much less expensive to build than high ones; that it is possible to use forms without the usual waste of lumber; that when this waste is avoided, forms greatly reduce the cost of stonework (see Part VI); also that much may be saved in the construction of foundations by methods described in Part XVIII.

The theory for the use of wood is: that it is more economical to use a better grade of wood, expose the construction and correct shrinkages, if they occur, than to use poorer stuff for structural members and then go to the expense of covering them up and casing them in. Indeed, under this latter plan, which is the common one, more material is often required for the casing than for the structural members themselves (see Part XXI).

The theory for the design of these houses is: that the most economical way of obtaining good results is to apply the great, fundamental principles of art; and depend on them for beauty, rather than upon the use either of applied ornament or more expensive materials (see Parts XI, XX, XXIII, XXVIII, XXIX, XXXII, XXXV, XLI, XLIV, XLVII, and L); that much better results are likely to accrue from truth than falsehood, and from architectural than archæological methods (see Parts V, XVII and XXV).

The improvements recommended may be classed under three heads: appearance, convenience, and economy.

Improvements in appearance may often be had in ways conducive both to economy and convenience, for beauty is largely dependent on fitness, and fitting methods are usually the most convenient and economical; therein, indeed, to a great extent, lies their very fitness (see Part XXVIII).

Convenience depends upon the observance of the proper relationship between the six departments or divisions which go to make up the ordinary American home. If any of them is insufficient, poorly arranged, neglected, or misplaced, loss of convenience will follow, and in judging of the merit of plans, the most careful consideration should be given to each of these points (see Part VII).

It is highly important that the small house should be economical in its design and construction. Economy in building consists in the aggregate of a great number of savings, which when considered separately may seem trivial, but which when combined are important. The list of those here provided for is quite formidable, and many of them are novel. They may be divided into classes as follows:

1st. *Saving of time, trouble, and money in the preparation of plans by the module system, and the standardization of parts and methods.* By these means all figuring of plans and the making of most detail drawings are avoided; ease and speed in planning greatly increased;

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plans simplified; pleasing proportions more readily obtained; and the work, both in design and execution, greatly improved (see Parts I, II, and XXXI).

2d. *Saving of space:* (a) By the utilization of the large volume of space contained in the slopes of roofs, which the ridge-dormer permits of (see Part III); (b) by the reduction of floor thickness from 12 and 15 inches to 3 inches (see Part XXX); (c) by the utilization of space (as on shipboard) for lockers, cupboards, closets, etc., which is commonly furred off and wasted (see Part VII); (d) by the use of thin partitions, whereby two-thirds of the room usually occupied by partitions is saved for other purposes (see Part IX); and (e) by the elimination of corridors in making use of living-rooms, and otherwise planning, so that the least possible area may be required for communication (see Part VII).

3d. *Saving of materials:* (a) By greatly reducing the average height of walls, which results from the use of the ridge-dormer, and reduction in floor thicknesses (see Parts III and XXX); (b) by reducing the size and cost of foundations, by means of frost-proof walks, toe, and dry walls (see Part XVIII); (c) by the omission of the cellar under the whole or a part of the building, as facilitated by the economical method of damp-proofing recommended and the character of the plan which results from the use of ridge-dormers (see Part XVIII); (d) by the omission of much of the ground-floor beams and wooden underflooring (see Part XVIII); (e) by the elimination of all wooden studs and lath from partitions (see Part IX); (f) by the elimination of practically all trim, casing, base-boards, and their moldings (see Part XXI); (g) by the omission of framing and casing of dormers (see Part XXXIII); (h) by the omission of most of the plastering (see Parts XXX and XL); (i) by the use of splayed jambs which also improves light (see Part VI); (j) by the use of a special type of casement windows (see Part XII); (k) by the omission of applied ornament, reliance for beauty depending on other means (see Part XXXV); (l) by greater economy in making and using forms (see Part VI); (m) by the omission of stone sills (see Part XII); (n) by the omission of raised verandah floors, steps, balustrades, etc. (see Part XIX); (o) in the shortening of all stairs, pipes, ducts, drains, and wires, due to the reduction of floor thicknesses (see Part XXX); (p) in the avoidance of waste by designing for the use of standard lengths and sizes of material without cutting, as for beams, glass, etc., which the module system of planning makes easy (see Parts I and XXXI); (q) in the avoidance of things requiring paint, and the use of wax for the finish of interior woodwork (see Part XIX); (r) in the reduction of the size of sleepers for flooring (see Part XXX); (s) in the more economical use of concrete (see Part XXIV); (t) in the saving of about one-half the piping in the installation of plumbing drainage as compared to the New York requirements; (u) in the elimination of butts and screws for the hanging of windows and doors; and (v) by the omission of fly screens, the netting being directly applied to the window-frames (see Part XII).

4th. *Savings in labor:* (a) By the lowness of the walls, which the ridge-dormers make possible and which, to a great extent, reduces scaffolding and the hoisting of materials (see Part VI); (b) in the use of unskilled labor in building walls, by backing the face stones with concrete, and placing the face stones in the forms dry without the use of mortar, except for pointing (see Part VI); (c) in the simplification of woodwork, especially in the hanging of windows and doors, and in the setting of trim (see Part XXI); (d) in the application of hardware, chiefly on account of the kind of hinges used and their installation in the shop (see Part XXXVI); (e) in the standardization of parts and the use of similar members, which permit of their being made by the quantity (see Part XXXI); (f)

by cutting out about one-half the labor in the installation of plumbing drainage (see Part XXXVIII); and (g) by the greater use of machine and shop work, which the exposed structural members permit of (see Part XXI).

5th. *Savings by the use of more economical devices, materials, and methods:* (a) In the matter of roof-covering (see Part XV); (b) in heating and plumbing (see Parts XXVII and XXXVIII); (c) in hardware (see Part XXXVI); (d) in the use of tiling (see Part XIX); (e) in the use of cement (see Parts XXIV and XLVIII); (f) in the matter of damp-proofing (see Part XVIII); (g) in the method of flashing (see Part XV); (h) in the preparation of floors for tiling (see Part XXX); (i) in the construction of bearing partitions (see Part IX); (j) in the arrangement of the screens and shades (see Part XII); (k) in the avoidance of excavation and grading by adapting the building to the conformation of the land (see Part XIII); (l) in the more economical use of land by the European method of placing the buildings at the side of the road (see Part IV); (m) in furring (see Part VI); and (n) in the standardization of methods by which the work of construction becomes simply a matter of routine in which each mechanic can perform his part without special direction (see Part XXXI).

These and other economies and peculiar methods, described and illustrated by drawings and photographs, affect most things entering into the construction of the house, and their application in actual practice has been found to greatly reduce both the cost of construction and the expense of maintenance.

Improvement in the appearance of the buildings is largely due to the better proportion, especially as regards height, which the use of the ridge dormer makes possible (see Part XX); to the simplicity, honesty, and fitness of the methods employed, which impress the imagination as reasonable and right; and also to the treatment of dependencies and grounds (see Parts XIII, XVI, XXII, XXVI, XLIX, and LI).

To obtain the best results as touching appearance, convenience, and economy, it is highly important that the young designer should understand and apply sound principles of design, and it is for this reason that so large a part of this work has been devoted to them.

The theories upon which the essays on design are based are as follows:

1st. The art of ancient Greece demonstrates that study of the beauties of the human form leads to beauty in all kinds of design, and that under proper conditions this study may become general (see Part VIII).

2d. In the best specimens of the human form are contained all the principles of good design and the fountainhead of art (see Parts VIII, XIV and XXXII).

3d. The best art, and the only art which will ever lead to great results, must have for its basis the interpretation of beauty in nature (see Part XIV).

The ancient Greeks rendered two great services to the human race: they endowed the world with the most beautiful productions of art which it possesses, and they showed how the same results may again be obtained, for their methods and aims were so simple and clear that there is no mistaking them nor their meaning.

With the Greeks, art and beauty were synonymous terms. Their art consisted in the interpretation and preservation of beauty in nature, and in so doing they were superior to nature (see Part XXXII).

For more than two thousand years art has been complicated; it has been much interested in the portrayal of emotions. The only emotions which Greek art excites are those supremely pleasing ones

INTRODUCTION

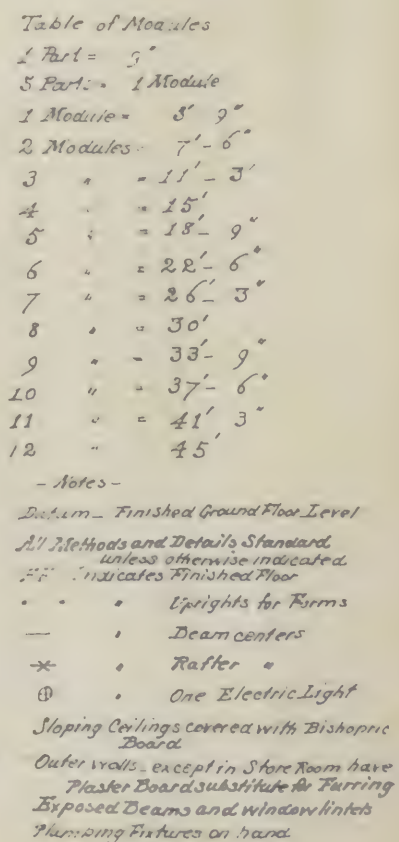
which are produced by the contemplation of beauty. The Greek aim was not so much to imitate nature as to extract the essence of its charm. For more than two thousand years other methods have been tried and other objects sought, but how does the product compare with Greek art? When will those experiments come to an end and the true method again be tried? When will that which the Greeks found be sought by the way that led the Greeks straight to it?

When the true principles of design are forgotten; when, in art, the bizarre and novel is the aim rather than the beautiful; when

complication and mystery take the place of what should be as simple and clear as the atmosphere, design runs amuck, and becomes so hopelessly involved in difficulties that such manifestations as cubism, impressionism, futurism, and art nouveau show their ugly heads and pose as art.

Why can there not be a new art founded on the only principle which can produce great art—the principle that art is the interpretation or extraction of the essence of beauty in nature, and that all else is secondary?

N^o 1



THE MODULE SYSTEM IN CONSTRUCTION

THESE designs are made on a module system. That is to say, there is a modulus or fixed unit of measure running through all parts. The sheets are divided into squares of uniform size. In general, the elevations are grouped about the ground-floor plan so as to bring each one opposite that side to which it belongs. When necessary a section of the building, taken on some designated line, is also given. When the building contains more than the ground floor the plans of the other stories are placed at one side. On most of the sheets there is a perspective sketch of the building, or a particular part of it, and sometimes detail drawings illustrative of design or construction on a larger scale. The module lines do not apply to the perspectives, but to the plans, sections, and elevations; and all dimensions, horizontal or vertical, may be ascertained by counting the squares and consulting the table of modules at the upper left-hand corner of the sheet. With the details the scale is given in each case.

Great economies result from the use of this system both in making plans and laying out and executing work, so that certain features such as beam ceilings, which without it would involve greater expense, with it reduce cost. By it practically all figuring of drawings and all liability of error, on that account, are avoided. One side of all walls (generally the inside) runs on the module line and most partitions, door, window, and other openings, are centered on it. If, for any reason, a departure is made from this rule, it is only necessary to give the distance to the nearest module line. When drawings are made in this way nothing is left to doubt; every dimension is fixed, and a mistake in one part will not affect other parts.

By the common method of making working drawings it takes almost as long to figure the dimensions as to make the drawings themselves, and there is great chance of error; moreover, a mistake in one figure may cause mistakes in other figures.

By the use of the module system the work of making the drawings is so simplified that it can be done by the architect himself, free-hand, as these drawings are made, to the great benefit of the design and at a saving in time and cost.

In this country the general practice is to leave too much to the draftsman. By so doing, the architect loses individuality, especially if he has a large practice. He is apt to become a business man rather than an artist. Any system which tends to give the architect more intimate control of his work and make of it a profession rather than a business, ought to be of benefit.

The writer was once told by an English architect, visiting this country, that the thing which most surprised him here was the number of draftsmen in architects' offices. He said that in London the most prominent architects rarely have more than three draftsmen, and that one well-known architect of his acquaintance would never accept commission for more than a single building a year, that being all he felt he could properly care for.

The module used in these designs is 3' 9". On the working drawings this is divided into five parts of 9" each and the sheets ruled accordingly. The reason for adopting that particular unit for these little houses was because multiples of 3' 9" give very convenient dimensions, both for the room and story heights and also economical sizes for building materials in the avoidance of waste. Standard lengths of lumber, for instance, are graded at two-foot

intervals. Beams and other scantling are cut to lengths of 8', 10', 12', 14', and so on. Multiples of 3' 9" give lengths of 7' 6", 11' 3", 15', 18' 9", so that, by using standard lengths of timber, these distances can be spanned, and sufficient bearing had on the walls, without cutting, and therefore without waste. Multiples of it also give very suitable dimensions for rooms of the kind wanted. Three feet nine inches is a convenient unit in setting the forms for masonry, and divisions of it apply in many ways. All beams and rafters are spaced on the module and half-module; one-quarter of a module is a suitable width for stair treads of the more important stairs, while one-fifth of a module serves for others. The full module is a suitable width for corridors and also most windows; and permits the use of standard panes of glass without cutting. Two modules, or 7' 6", does for most story heights, while three modules, or 11' 3", serve for the higher stories.

The use of the module, in construction, induces a degree of accuracy and precision almost unknown in work of this class. Indeed, it makes it easier to build accurately than otherwise. If the main module lines are exactly established, all goes ahead like clock-work. Everything fits and most things may be gotten out in the shop and simply stood in place.

For the proper standardization of work, the module is essential; for by it alone can commensurability be obtained throughout. When a building is designed without a module it is next to impossible to avoid special features. Occasions arise when the standardized features will not fit and special drawings and workmanship must be resorted to; always at a loss of time, money, and efficiency. If the module is of sufficient size, this is avoided. All things, being governed by the same unit, work together in harmony. Beams, for instance, are always properly spaced with regard both to the room itself and all features of it, such as windows, doors, and other openings; which always come in their proper places with respect to the rest of the plan; and the work has an appearance of finish and forethought seldom found except in the most carefully studied monumental constructions. All of which is accomplished at a great saving of time, trouble, and expense.

The system of building, described in this work, is intended for repetition. It would hardly pay to adopt it in its entirety for a single house if the matter were to end there. Where the processes and apparatus are used, over and over again, great economy should result; but for a single building, the trouble and expense of introducing so many new or unusual features and methods, might well offset the benefits which should accrue under more favorable conditions. Standardization both of parts and workmanship plays a great part in the economies obtained and standardization implies quantity.

Plate 1 is the actual working drawing for the little house of Plate 30. When used in connection with the standardized methods and details, as described in this work, no other drawing is necessary in the erection of the building. It was made by the writer, free-hand, in about three hours. To supply the same information in the usual way would require about as many weeks of a draftsman's time and a cost which would consume most, if not all, of the commission. The drawing was made on paper ruled, as has been said, with the module lines and parts, and from which blue-prints may be made.

SMALL HOUSES

In laying out work on the ground, the main module lines—*a*, *c*, *k*, *l*, *4*, and *9*—are first established. This is done by setting up two stakes with a crosspiece between, a little beyond the work at each end of the line needed, and driving a nail in each crosspiece on the line, so that a cord drawn from one nail to the other exactly defines it. (See Photograph.)

The trenches are then dug and the foundation walls built and made smooth and level on top, at two inches below the finished ground-floor level. The module lines are accurately marked on these walls, the uprights for the forms for the masonry walls are then set as indicated by the dots on the plan. (See Mosaic Rubble VI.) Any irregularity in setting the uprights can be readily detected by sighting along the lines.

If the forms are well made and the work of setting them properly done, this method secures remarkable accuracy, and all parts fit with the most surprising and delightful precision, which greatly facilitates progress. If all necessary materials are on hand, as they should be before beginning, the work proceeds with a degree of exactness and speed uncommon in ordinary building.

As all parts and methods are uniform in each instance, the workmen soon become used to them. Although the designs may vary indefinitely, the parts and their manner of use remain the same; so the process soon resolves itself into a matter of routine.

As all walls, foundations, partitions, framing, floors, doors, windows, and other details throughout are made and used in accordance with the methods herein described and illustrated, no other specification is necessary than to indicate the kind and quality of the materials. Owing to the standardization, it is not necessary to show how the various parts are made and fitted, but simply their location; which is done with accuracy by the lines without figured

dimensions. All parts will agree, and there is less chance of those disagreeable surprises which sometimes happen when the various floor plans do not correspond. Of course, it is not contended that no mistakes can occur; but there is less chance of them, and, if made, they can more readily be detected. Moreover, a mistake in one part will not affect other parts, as where there is an error in a row of figured dimensions.

The method of designating the modules as illustrated on this working drawing (Plate I) where longitudinal modules are indicated by figures, lateral ones by letters and heights by roman numerals, has been found convenient in practice. It is thus easy to designate any part of the work with accuracy. If, for instance, one says 9, *d*, III, there can be no doubt as to the exact point indicated.

By this system the drawings may be fewer and smaller than usual, a great convenience in building, because large drawings are troublesome to handle in the open air. For this purpose the sheet is mounted on a piece of compo board or similar material. If the house is small only one drawing will be necessary, and except for the larger ones two sheets generally suffice.

As will be seen on many of the plates, the module lends itself admirably to illustration in detail. If it is desired to show any part of the work at a larger scale than that of the general working drawing, one has simply to assume that the squares represent some convenient subdivision of the module, as 3", 5", 9", or 15" and work accordingly.

Both speed and economy in building depend on forethought, and no kind of forethought is so effective as a well-digested system of this sort. The one presented here is the result of much thought and experience, and, if properly followed, should greatly reduce the cost of building.



No. 1

Laying out a building on the ground. Main module lines defined by cords.

THE MODULE SYSTEM IN DESIGN

FOR more than two thousand years the meaning and use of the Greek triglyphs have been a mystery and an archæological problem of the first magnitude. This is not because there is anything which ought to be mysterious about them, but simply because the Greek method of design has been a lost art. To the Greek the meaning and use of the triglyph was certainly as obvious as those of anything else about the building. It was an essential element of the design. Greek art was extremely simple and direct; both in design and construction the Greek mind abhorred complication. The meaning of every other feature in Greek architecture is as clear and transparent as day, and so it is with this when the mystery is unlocked.

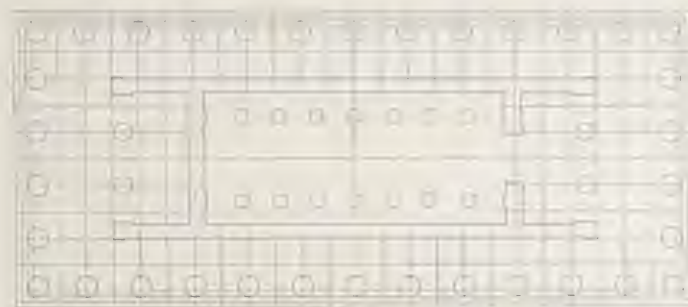
If one wants to learn the meaning of the triglyph, let him take the plan of any Greek Doric temple and draw lines through it in both directions from the centers of the triglyphs. He will then see that the lines so drawn undoubtedly formed the basis of the design (see Plans). The Greeks designed by a modulus or fixed measure, and that modulus, for the Doric order, was the distance between the centers of the triglyphs. This distance is in fact the primary unit of the design upon which every dimension, both of plan and order, depends. The design cannot be begun until it is determined, for the slightest variation in it affects the whole building and every detail connected therewith. The triglyphs stand in the frieze, at the corners of the building and at regular intervals on all sides of it; between them are panels, called metopæ, which are always square. The distance between the triglyphs, therefore, determines the height of the frieze. The height of the frieze determines that of the architrave, which is the same. The distance between the triglyphs also determines the spacing of the columns, for except at the corners of the building the center of each column coincides with that of every second triglyph. Upon the spacing of the triglyphs, therefore, depend absolutely the proportions both of plan and order. That spacing constitutes a fixed modulus for the entire design which never varies in its application and is, in fact, the harmonic scale of the monument.

For the Greek the triglyphs were indispensable. They fulfilled a function which in his eyes was all-important. From the main frieze they were never omitted and if for any reason they were dispensed with elsewhere, in places of secondary importance, as, for instance, to permit of a continuous band of sculpture, the proper location for them was carefully indicated by carving, on the architrave below, the base and guttæ. All this care was surely not taken in order to perpetuate, in stone, beam ends, which perhaps appeared at the sides of the earlier wooden structures; though those beam ends may have, in the first instance, suggested the form of the triglyph. Evidently it was done because the triglyphs were thought to be necessary, and this necessity was considered just as great at the ends of the building and under porticoes, where the beams could not have appeared, as at the sides.

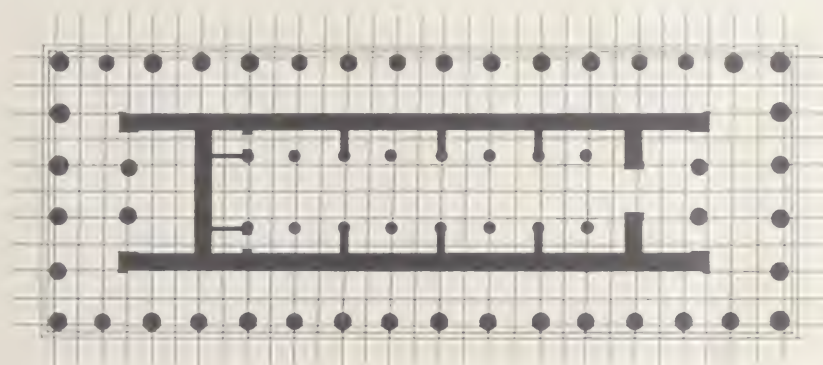
Now we know that to the Greek harmony was of supreme importance, and if the triglyphs represented the harmonic scale of the monument—if they formed the measure upon which the harmony of the dimensions depended, their meaning and use is abundantly explained. Those men practised architecture on a plane which has never since been reached. It is not surprising therefore to find them

using methods unknown to subsequent art. The universal admiration which Greek proportions have always excited proves that the method of obtaining them was correct.

It was only within comparatively recent times that several refinements in Greek architecture formerly unsuspected, such as the slight entasis of the columns, the greater size of the corner columns, and the convex curve of the stylobate were discovered, and now here is another refinement of even greater importance.



No. 2
Module lines of the Temple of Zeus at Olympia.



No. 3
Module lines of the Temple of Heræum at Olympia.

For more than two thousand years architectural design by the use of a modulus, except in the case of the classic orders, has been a lost art. It is one which should be revived and a subject worthy of the most profound study, but upon which the schools are silent.

It is almost universally admitted that certain combinations of dimensions produce harmonious results, but since the time of the ancient Greeks no system of design, consistently based on that knowledge, has been formulated.

It seems too evident to need argument that one who uses, in geometric design, only such combinations of dimensions as are known to produce harmony, will have a great advantage over him who depends on guesswork or chance for his results. It is also reasonable to suppose that when, in architecture, one uses a fixed unit and combinations of it, to produce harmony, the effect should be most striking and apparent where the measure is seen or felt, as it is in music by the measured beat and in poetry by the cadence and rhythm. This the Greeks fully understood and that scale or measure was supplied by the equal spacing of the triglyphs. No wonder they considered their presence of supreme importance.

If what has been said seems reasonable, we here have the solution of an archæological problem of the first order, and an architectural discovery which may prove of inestimable value to future art.

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My own attention was first called to the desirability of this method almost by accident. While working on a design, when a pupil at the Ecole des Beaux Arts, in Paris, it occurred to me to save time by drawing in the axial lines all at once. When that was done they appeared so nearly of uniform spacing that I determined to make them so and see what would happen. This necessitated a number of slight changes in the design, which, to my surprise, seemed to improve it; and the thought suggested itself that perhaps this uniform measure, pervading all parts of the composition and simplifying it, might, if properly used, serve, as in music or poetry, to give that harmony for which I was otherwise blindly groping. And is it not reasonable to suppose this may be so, for what is artistic proportion but harmony of dimensions? It seemed to me that the slight correction of what had been drawn, to fit it to the fixed unit which now governed, added a charm otherwise lacking; and I have repeatedly noticed the same effect in subsequent work. As in poetry or music, even the unskilled ear may be offended by a mistake in measure, without discerning the cause, may not also a mistake in the harmony of dimensions unconsciously offend us in design?

Having become convinced that the principle was right, I determined to use it as soon as occasion offered. That came in the very first building for which I was architect—St. Luke's Hospital, New York, and upon the module chosen the entire plan depends, from its layout on the ground to the spacing of the modillions of the cornice. In marking the modules on the work in this way, I thought, with pride and satisfaction, that they might serve to show how I had obtained the good proportions which I fondly believed the buildings, in some measure, possessed; but the module was not used for heights.

The second building in which I was able to use the system was the Corcoran Gallery of Art, Washington, D. C. Here the module lines were indicated on the structure, by the points of the cheneau. The short pilasters, between the pierced panels of the claustra, marked every second one. At that time, before I knew what a small estimate would be placed on my work, and filled with the enthusiasm of youth, I wondered whether the meaning of this harmonic record might not some day be recognized.

Since then I have used the system in buildings, public and private, for hospitals, churches, warehouses, office-buildings, hotels, mansions, and cottages. Even for tenements it has worked well, and plans for several large groups of model fireproof tenements were made in this way. In the Naval Academy at Annapolis the module governs both the plans of the buildings themselves and their arrangement on the grounds.

I mention all this simply to show the adaptability of the method, and my own experience in its use.

I have used the system long enough to become well acquainted with its properties and think I realize both the advantages and danger in its use. Like fire, it is a good servant but a bad master. The danger is that it may lead to a cramped and mechanical design. One may easily become a slave to the module, and do things because of it which his taste or reason would not otherwise commend. Its advantages are great. It is the easiest and surest way of obtaining harmony of dimensions and commensurability in all parts of the design. It is the simplest way of designing, and the most convenient and economical method of executing work. How can the danger be avoided and the benefits secured?

It was only quite recently, while examining Laloux's restoration of Olympia, that the thought flashed on me as to what might be the meaning of Greek triglyphs. Did they not indicate the module? Were they not the record of the harmonic scale of the monument?

Had not these buildings been designed by a method similar to that which I had so long been using? Had not the builders marked their scale on the work, just as I had marked mine, and for the same reasons?

When I had drawn out the plans of several of these buildings, having first ruled the sheets with the module lines as indicated by the triglyphs, I had no doubt that this conjecture was correct. What was my surprise and satisfaction to find that practices which I had, by long experience, found best were apparently the very ones used; and also that the one danger which I had always recognized and supposed inherent in the system, was, by a very simple expedient, which I had never thought of, completely removed.

If one will take the plan of any ancient Greek Doric temple and draw lines through it in both directions from the centers of the triglyphs, he will see, as has been said, that they undoubtedly formed the basis of the design. He will also see that, in general, care has been taken by the designer to use the lines rather than their intersections. While the module lines govern, their points of intersection are, for the most part, avoided. With the Greeks the system was not in the nature of co-ordinates. Thus all danger of a cramped or mechanical plan was completely removed.

In peripteral buildings the outer face of the lateral walls of the cella generally follow the third module lines. The main columns never stand at the intersection of module lines; and it was perhaps to avoid such intersections that the end intercolumniations differ from the others. In the most ancient example, the Heræum at Olympia, the module lines of the main order govern inside the cella also, but in later buildings it often happens that an auxiliary module is used for the interior, which coincides only at a certain point, or points, with the main one. In the Parthenon there seems to have been more than one of these auxiliary scales, and even the second row of columns, at the ends, are arranged by some method which is not clear. Apparently the inside face of their architrave runs on the fourth module line.

Most peripteral Doric temples may be classed by the placing and ending of the lateral walls of the cella, as follows:

Placing:

1. Face of wall on a module line.
2. Wall centered on a module line.

Ending:

1. Both ends terminate about in line with columns in antis centered on a module line; either transverse or longitudinal.

Note: If centered on one they are apt to be off the other, apparently to avoid intersections. Sometimes they are off both.

2. Both ends terminate on a module line.
3. One end terminates in the first of these two last mentioned ways and the other in the second.

This permits of six possible arrangements of wall, as follows:

- | | | |
|----|----------|--|
| A. | Face | on a module line; both ends stop on a module line. |
| B. | Centered | " " " " " " " " " " " " |
| C. | Face | " " " " " " " " " " " " with columns in antis. |
| D. | Centered | " " " " " " " " " " " " |
| E. | Face | " " " " " " " " " " " " { one end stops on a module line, and the |
| F. | Centered | " " " " " " " " " " " " { other with columns in antis centered on a module line. |

Examples:

- A. Metroum at Olympia.
- A. Temple of Zeus at Olympia.
- A. Temple at Selinus (designated C by Koldewey).
- A. Parthenon at Athens.
- B. Temple of Nemesis at Sunium.
- C. Temples at Selinus (designated A and O by Koldewey).
- C. Temple at Pæstum (Basilica).
- C. Temple at Bassæ.
- C. Temple of Hercules, Agrigentum.
- D. Temple at Ramnus.
- D. Temple at Syracuse (Cathedral).

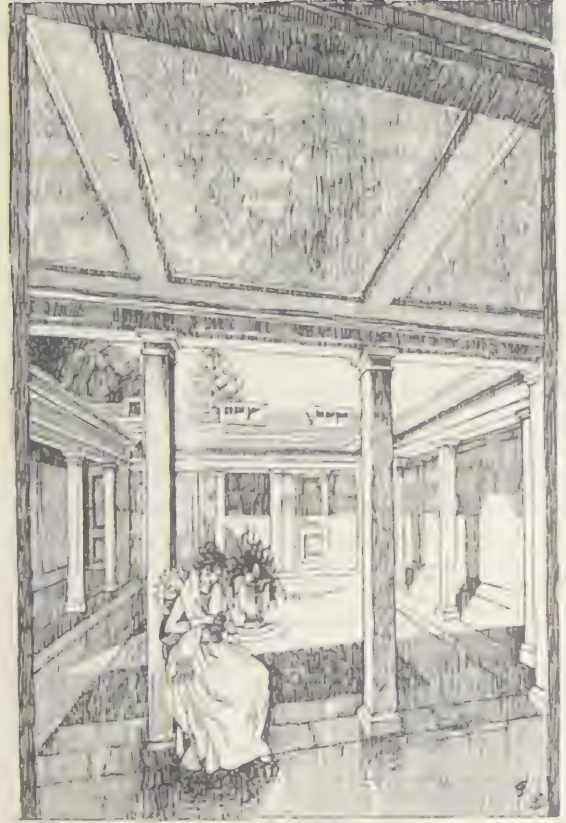
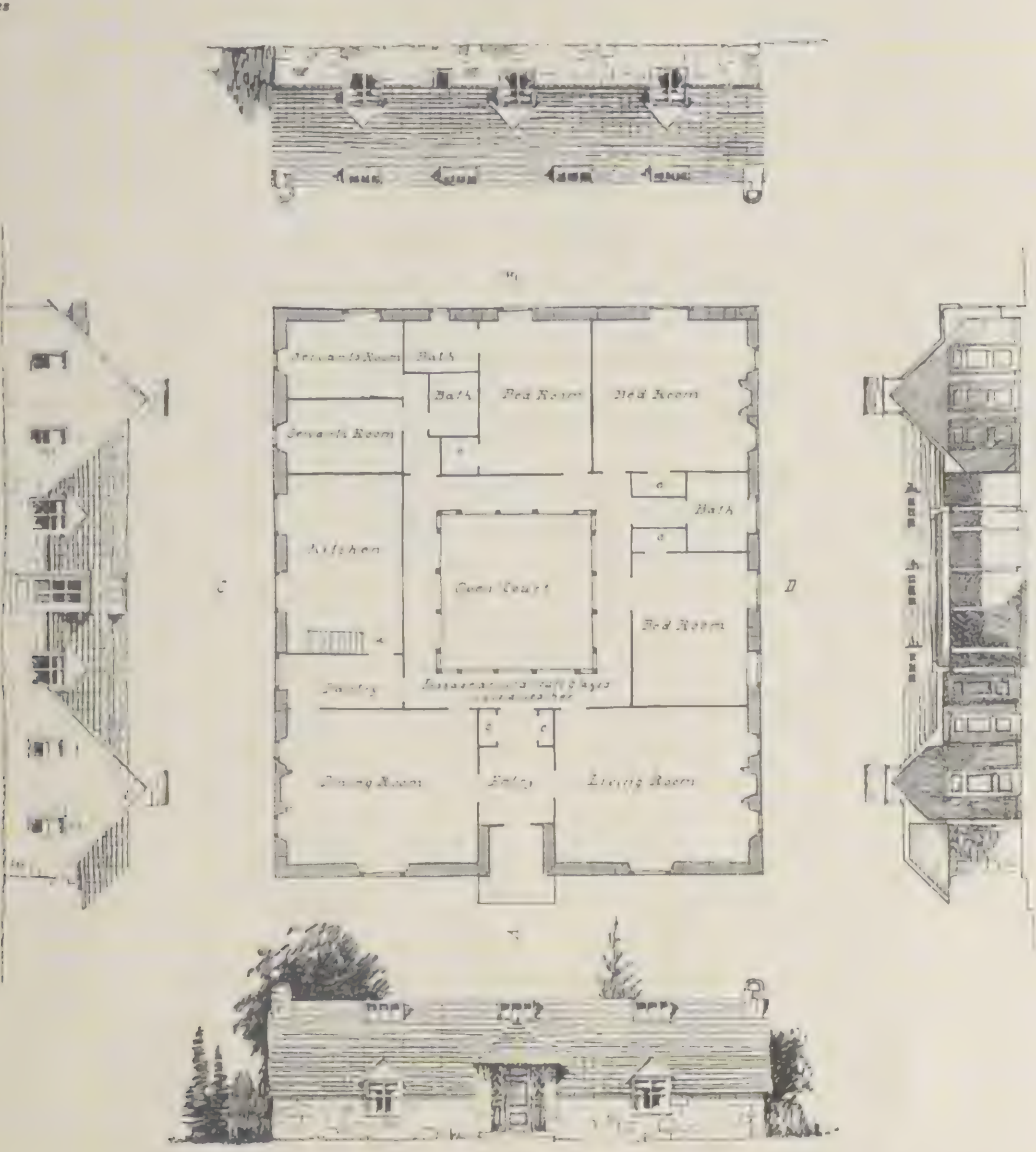
Houses for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 2

HOUSE A

Table of Modules

- 1 m = 3'-9"
- 2 " = 7'-6"
- 3 " = 11'-3"
- 4 " = 15'-0"
- 5 " = 18'-9"
- 6 " = 22'-6"
- 7 " = 26'-3"
- 8 " = 30'-0"
- 9 " = 33'-9"
- 10 " = 37'-6"
- 11 " = 41'-3"
- 12 " = 45'-0"
- 13 " = 48'-9"
- 14 " = 52'-6"
- 15 " = 56'-3"

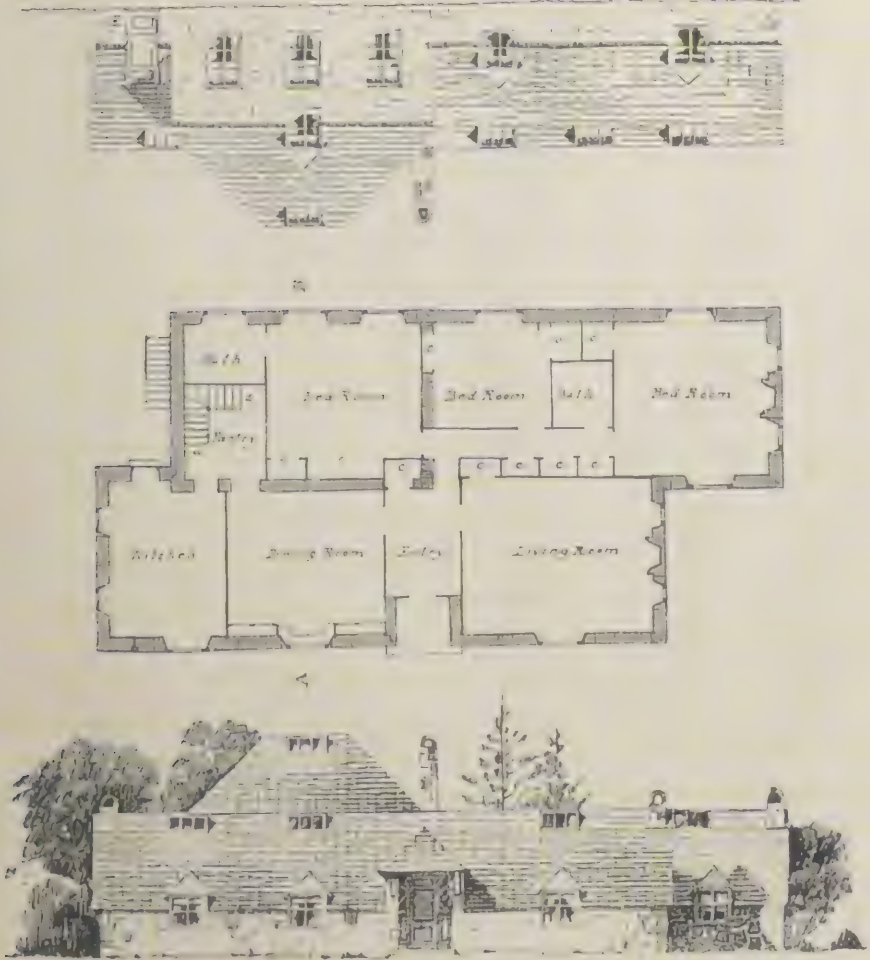


View of Living Room

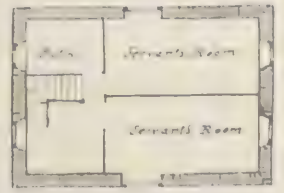


Section on Line C-D of Plan

HOUSE B.



Section on Line A-B of Plan



Plan of Second Floor

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- E.* Heræum at Olympia.
- E.* Temple at Pæstum (Neptune).
- E.* Temple of Theseus at Athens.
- E.* Temple of Hera, Selinus.
- E.* Temple at Epidaurus.
- E.* Temple of Juno, Agrigentum.
- E.* Temple of Concord, Agrigentum.
- I.* Temple of Jupiter at Ægina.*

About one hundred years ago L. N. L. Durand, professor of architecture at the Polytechnic School, Paris, well known as the compiler of the "*Recueil et Parallèles des Édifices de Tous Genres*," wrote his "*Précis d'Architecture*," setting forth the advantages of this method of planning; but he did not deal with the danger in its use; and so far was he from realizing that triglyphs had any bearing on the theory he was expounding that he refers to them as useless, having no meaning and no resemblance to anything, or at least to anything reasonable.

I know, from my own experience, that when one uses a module in architectural design, in the manner described, the temptation to indicate it on the structure is almost irresistible. It is the natural thing to do. One does it almost instinctively, and in looking back over my own work I find that, in every instance where this system was used, in some way, the imprint of the module appears on the building, and I am firmly convinced that a Greek architect of the great epoch would no more have thought of omitting the mark of the harmonic scale of proportion, on which the design was based, than would the composer of music think of omitting the harmonic scale of his composition.

This theory of the meaning and use of triglyphs is not founded on elaborate mathematical calculations, but is so simple that any one may test its truth. Little respect is due to theories of the other sort when applied to architecture. They prove too much and are too easy to find. Many wonderful things may be found in almost any geometric design. I once took the elevation of an ordinary New York tenement-house, which had certainly been designed on no very elaborate theory, and tried fitting circles and triangles to it and drawing mathematical deductions therefrom. I found the possibilities almost limitless and that theories without number might be set up and demonstrated. It is therefore safe to conclude that one who

* Note: This temple is irregular in that the module line is neither on the face of the wall nor at its center, but 6" inside the face.

adopts such methods to discover the hidden mysteries of ancient designs is likely to deceive himself.

In testing this theory doubtless many hair-splitting irregularities will be pointed out; it is well understood that irregularities exist, but they do not affect its correctness. The Greeks were men of sense; if they used the system they did so for a purpose, as artists rather than mathematicians and imperceptible irregularities could not affect that purpose.*

It has been well said that the Parthenon stands as a reproach to the rest of the world. May not this be because the rest of the world has forgotten, or never knew, the principles which made the Parthenon possible and of which harmony of proportion, as the Greeks understood it, was one?

If the Greeks used this system in their buildings of the Doric order—the most ancient of all—is it not likely they used it with the other orders? Be this as it may, there have always seemed to the writer sound reasons for using the module system in architectural design.

Plate 2

These two designs illustrate the extreme lowness of lateral walls which this system of building makes possible. The walls are only about 4' high, which is scarcely more than is often used for foundation walls of ordinary houses.

House *A* is intended for summer use. If occupied in winter it would be necessary to enclose the passage around the court. It has but a single story and all rooms are provided with ridge-dormers.

House *B* has two stories in part, the servants' rooms being placed over the kitchen. The accommodations in the two houses are very similar, viz.: living-room, dining-room, three masters' bedrooms, and two bathrooms; also kitchen, pantry, and two servants' rooms with a bath. These houses are very characteristic of this way of building and of great economy.

* In this matter one may easily deceive himself by considering what the builders did, rather than what they tried to do. It was not easy to lay out a great building on the ground accurately without instruments, such as we have; and in the early work of every great building movement errors were apt to creep in. It is only after the builders acquire skill by practice that great accuracy can be expected; but, though the laying out may be defective, it is generally easy to see, from subsequent examples, what the aim had been. In the Heræum at Olympia, for instance, there are great irregularities in the spacing of columns, in their transverse alignment, and even in their size, but the accuracy of subsequent work in this same sacred enclosure shows what the earlier builders had tried to do.

One sees this same thing in Gothic architecture. It took practice to acquire accuracy. Notre Dame, Paris, was, when started, probably the largest Gothic church yet projected; and in its layout are irregularities not common in later examples. Like the Heræum at Olympia, the columns are in line longitudinally, but out of line transversely.

RIDGE-DORMERS

THE most important deviation from ordinary methods which these designs illustrate is in the use of ridge-dormers, or their equivalent ridge skylights, and the various consequences arising therefrom.

One of the most ancient and inexpensive ways of obtaining shelter, was to utilize the space under sloping roof rafters. Indian wigwams have no other kind. Where civilization is slightly more advanced, low stone walls are built upon which the feet of the rafters rest. In many countries of Europe such houses abound in rural districts, where they charm the traveler by their picturesque beauty. Nestling close to the ground, they seem to belong to the landscape, and present a most attractive and comfortable appearance; but they are comfortable in appearance only. In reality they are hovels, gloomy, stuffy, and hot in warm weather. Only people of the lowest orders of society will occupy such dwellings.

These disadvantages, however, can be entirely removed by the expedient so much in evidence in these designs; *i. e.*, the ridge-dormer. By its use space in the roof, otherwise of little value, becomes the most desirable. Instead of being gloomy, stuffy, and hot, the dormers render it perfectly ventilated, light at all times, and cool in hot weather. In frame buildings it is not so easy to use this room to advantage, because there must be tie beams, at the foot of the rafters, to withstand the thrust of the roof.



No. 5

Interior view of ridge-dormer, open, with fly-screen and cheek pieces in place. An exterior view of this same dormer is given in Photo No. 4.

Space directly under the roof is generally used for storage purposes; and every one knows how hot it is in summer. There is usually little chance for ventilation, and in hot weather the sun, striking the roof, raises the temperature to such a degree as to render it most unsuitable for human habitation. Such attics, filled with super-heated air, act as great radiators extending over the upper floor of the building and heating the ceilings of the rooms directly below, so that they too are often much hotter than rooms lower down.



No. 4

A ridge-dormer, open, with its cheek pieces. The room of this wing is occupied by the room shown in No. 5. Note the lowness of the external walls in comparison with the appearance of height inside.

Where low stone walls are used no tie beams are needed, because the strength of the walls is sufficient to withstand the thrust of the rafters. The ridge-dormers are placed in pairs, at the very apex of the roof. They are opened and closed only once a year—in the spring and fall respectively; and are so arranged that no rain can enter. (See Photograph 4.) They are provided with fly screens, set in place when the sash is opened in the spring (see Figure 3 of the Plate). The ridge-dormer is peculiarly well adapted for hot climates, for by means of it rooms may be kept cooler than in any other way, except by artificial refrigeration. Hot air rises and cool air descends; therefore, if the air in a room is warmer than the outer air, it must rise and escape through the ridge-dormers; which, be it remembered, stand always open in hot weather. If, during a heated spell, the lower windows and doors are carefully kept shut, the air inside may be maintained at several degrees cooler than the outer air. As the air in the room must ascend and escape by the ridge-dormers whenever the outer temperature falls below that of the room, it follows that the coolest air of the twenty-four hours will find its way in through them, taking the place of the warmer air which escapes. It is generally several degrees cooler some time at night than in the day; and if care be taken to keep the lower windows and doors closed, that cooler air can be trapped in the house and held there during the day.

The writer is acquainted with a gentleman of Chicago who maintains the temperature of his house below 68 during the hottest summer weather by having his watchman open all windows during the coolest part of the night, and close them as soon as the thermometer begins to rise. But with ridge-dormers no such procedure is required, for the dormers work automatically; it is not necessary to close them in the daytime to keep out hot air, because hot air, being lighter, does not descend into cool air.

Ridge-dormers have many other advantages. In winter when

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closed, they help make the room cheerful and bright. Light from above is the best; it is nature's own method of lighting. Ridge-dormers greatly reduce the height of the building; because bringing into use space heretofore wasted, the eaves may be correspondingly lowered. Photograph 5 shows the interior of a room having an average height of 10', yet the outer walls are only 4' 6" high, and are shown in Photograph 4. More than one-third of the cubic contents of this room consists of space which, under ordinary methods, would be wasted; or, if utilized, of little value. Here, then, is a very large item of economy. It amounts to a saving in the height of the building of at least 4', with a consequent reduction in cost and great gain in appearance. The chief difficulty in designing small houses is to avoid an excessive appearance of height, and it is because that difficulty is not generally overcome that most modern small houses compare so unfavorably in beauty with many older ones. The general introduction of the ridge-dormer or its equivalent, the ridge skylight, would open up a whole new field of opportunity for the designer of small houses, for they solve the chief difficulty—that of height.

Ridge-dormers also remove an objection which some people have to one-story dwellings. Many women do not like to sleep on the ground floor, being afraid to leave their windows open at night. With ridge-dormers standing open, the lower windows may be kept closed and locked, while the room will be perfectly ventilated without them.

It is only fair to say, however, that along with the advantages come certain dangers which must be guarded against, for otherwise the dormers may easily lose, in winter, the credit they have gained in summer. When properly constructed and placed, ridge-dormers will discharge hot air from a room in a most surprising manner; but, unless precautions are taken, there is danger that heat will leak out through them in winter also. If, however, they are properly made

and securely closed in cold weather, this will not happen, and it is to insure their proper construction that the details of Plate 3 are intended, but the double sash is only needed where the dormers open directly into a room.

Some trouble is attached to almost every good thing. To keep out insects we screen our windows, but the screens are troublesome, and if not kept in repair and properly operated fail to do what is expected of them. To heat houses is both troublesome and expensive, but it is done for comfort. Ridge-dormers are conducive to comfort, but require some care. One must take the trouble to open them in the spring and close them in the fall; beyond that they involve little trouble or expense, and all summer long will operate automatically to clear the building of hot air. The dormers are placed where they are hard to reach unless one has a ladder sufficiently long, so people who want to obtain the benefits of them should provide themselves with such a ladder.

Instead of the dormers, skylights of the kind illustrated in Plate 39 may be used. If properly placed these should answer the purpose equally well; they are easier to make and operate, need no double sash, cost less, and some may prefer their appearance.

Plate 3

This plan is in the form of an L, the smaller part of which is pierced by a driveway separating the store-room from the main body of the building. The arrangement of this latter part is somewhat peculiar, the chief rooms, both up-stairs and down, being placed in a row on one side of the house and the dependencies, including means of communication, baths, pantries, etc., in a row on the other side; but all work together conveniently and plumbing lines are shortened. The main roof has a higher pitch than usual, so that there would be some storage space in its upper part, lighted by the ridge-dormers.

Table of Modules

1 m	- 3'-9"
2 "	- 7'-6"
3 "	- 11'-3"
4 "	- 15'-0"
5 "	- 18'-9"
6 "	- 22'-6"
7 "	- 26'-3"
8 "	- 30'-0"
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13 "	- 48'-9"
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15 "	- 56'-3"

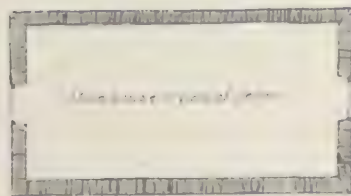
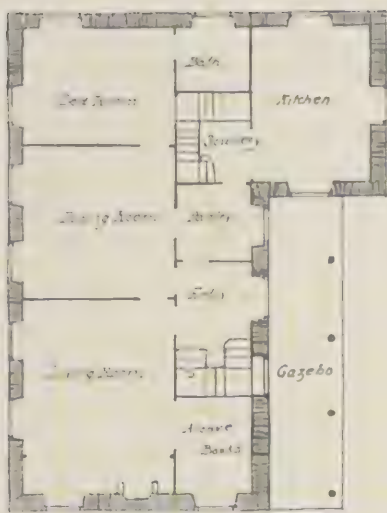
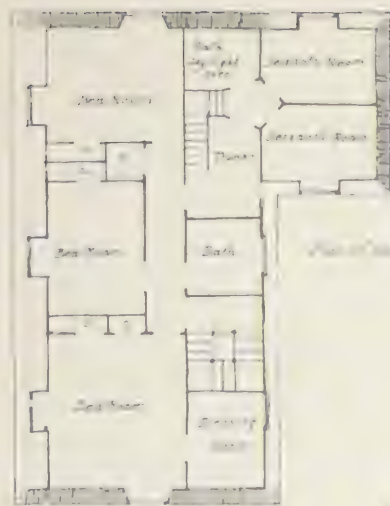
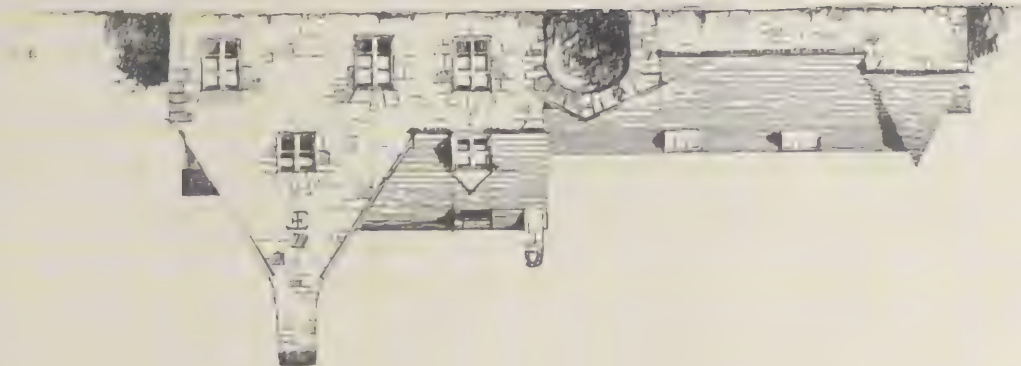


FIG. 4
SECTION THROUGH RIDGE DORMER
Showing
Construction

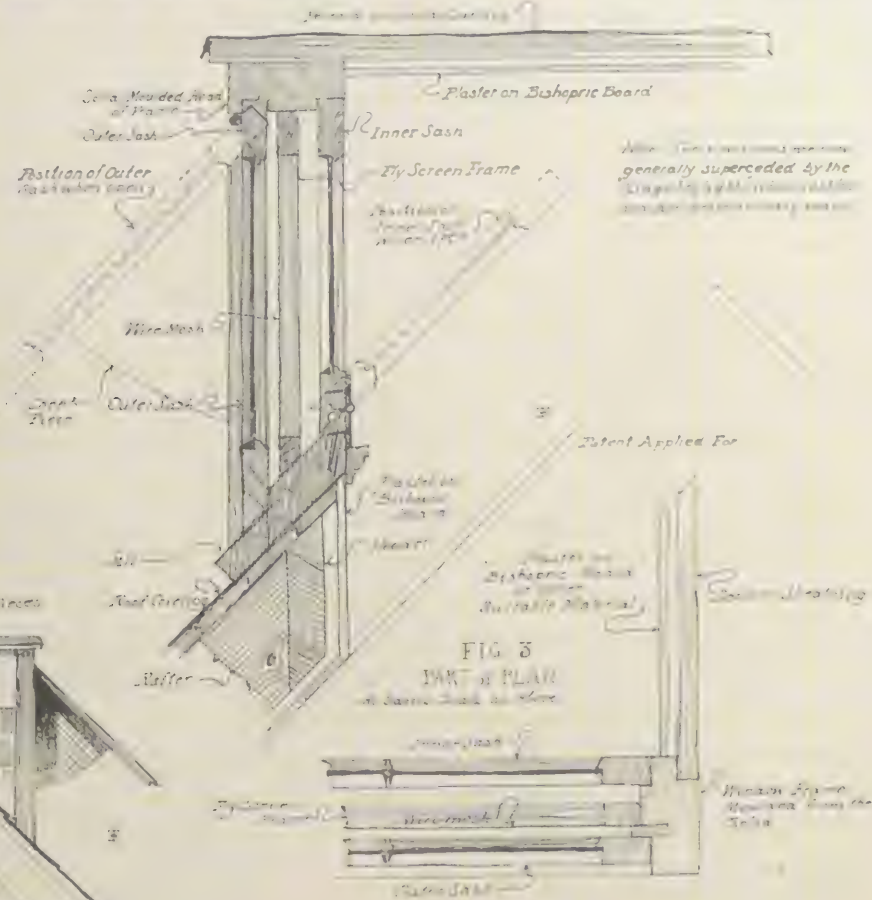


FIG. 1

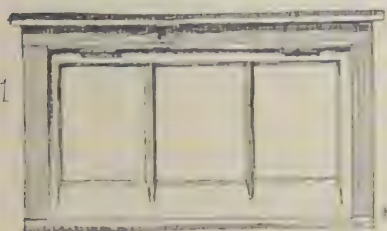
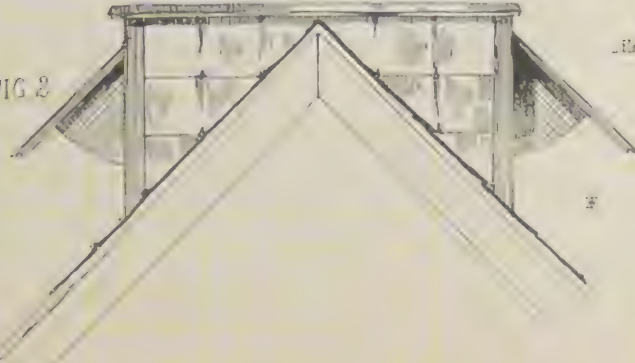


FIG. 2



IV

GARDENS

CAN anything call up to the imagination a more delightful vision than the privacy of a lovely garden, where, amidst trees, flowers, and shrubs, and secluded from the vulgar gaze, one may pass his leisure hours surrounded by the beauties of nature and the society of one's family and intimate friends?

In many European countries the garden plays a most important part in family life. It is to the garden, even more than to the house itself, that the most delightful associations of home attach themselves and memory most fondly lingers. Of France especially this is true. Whenever the weather permits, it is in the garden that the Frenchman takes his morning's bread and coffee, here the day begins and here it often ends.

Even the inns have their gardens where one may take his *premier déjeuner*, and what pleasant memories do they recall to one who has traveled much in France. The fragrant morning coolness of the verdure, the sheet-iron furniture, the spotless cloth, the bowl of perfect coffee and large spoon, the delicious bread and coils of fresh butter reposing daintily on a leaf.

Strange to say, our people seem to care little for that sort of thing, or at least few take steps to procure it. To most of them it is entirely unknown. To be sure, a number of people who possess considerable land about their homes have delightful gardens which are often sufficiently secluded, but to the generality of people the joys of that kind of garden which the European loves, where one may sit in privacy under his own vine and fig-tree, are undreamed of. The idea here in America is to have little land about the house and to that idea the garden is sacrificed. With us the house is placed in the center of the plot and the land all about it exposed to view from the road. Under such circumstances, if any out-of-door life is to be had on the premises, it must be enjoyed in public; for all is open to the public eye and that seclusion and privacy, so jealously guarded by the European and so intimately associated with his ideal of the garden's part in home life, is lost.

To such a pass has the custom of living in public been carried in this country that in many small towns and villages all fences and visible boundary lines between neighboring houses have been removed and thus even the very semblance of privacy destroyed.

The European of limited means places his house on the line of the road where it politely presents its ceremonious front to the passer-by, but the other front—*le côté intime*—is screened from public view, for the garden is sacred to family life. Protected from all undesired intrusion, there can be had that delightful privacy and seclusion which the very word garden should suggest. The smaller the plot on which the house is built, the greater the necessity for such an arrangement; for with a limited area that is the only way sufficient land with sufficient privacy can be had.

To obtain full benefit of the garden for the intimate life of the family on plots of limited area, the house should be placed with its long side on the road so as to occupy the least depth, and thus obtain both the greatest area and the greatest seclusion for the garden.

It is a mistake to think, as our people seem to think, that streets and roads bordered by houses placed in this way are not attractive.

The quaint and picturesque streets of thousands of European towns and villages (to say nothing of such typically American examples as some parts of old Salem, Mass., and Newport, R. I.) prove the contrary to be true. To one who understands the theory of their arrangement, these houses bordering the public way present to the imagination delightful ideas of the home life and comfort which lie behind them.

It is not only in the rural districts of Europe that this custom prevails, but in cities too. From time immemorial in France, and to a lesser degree perhaps in other European countries, the garden has been a part also of the ideal city home. The great private mansions of the ancient nobility in Paris were almost invariably provided with gardens. These houses are preceded on the side toward the street by a paved courtyard; protected on the line of the roadway by a high wall broken only by the stately gateway; on two sides of the court stand the stables and other dependencies of the mansion. The house itself, occupying the full width of the lot, presents one façade to the court and the other to the garden beyond; thus the utmost degree of privacy and seclusion may be enjoyed by the family. This is the ideal French conception of a city house; and the humbler dwellings of the people make the nearest approach to it that circumstances will permit.

It must not be supposed that the writer advocates the placing of all houses on the street line. Where there is plenty of land, and sufficient means to maintain a cultivated area on the road side of the house, without injury to the garden, by all means have it; but if sacrifice must be made, let it not be at the expense of the garden.

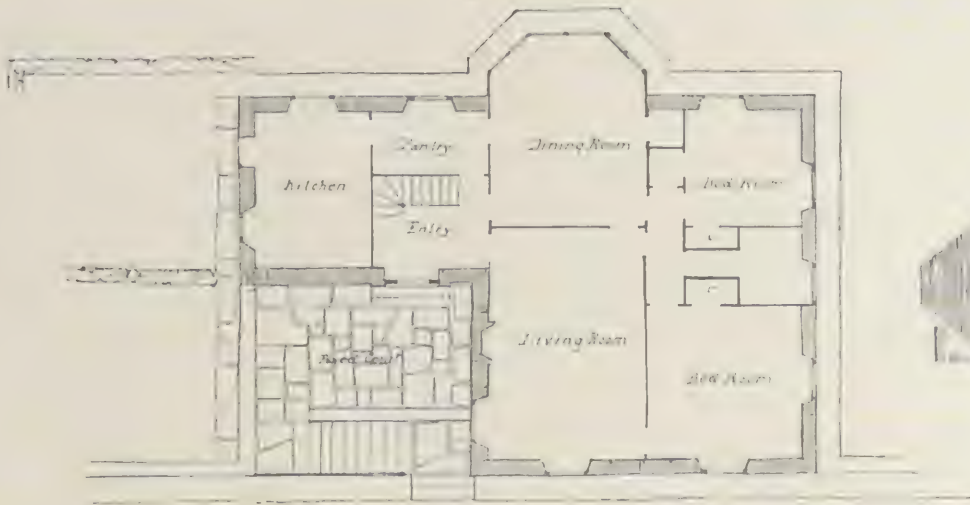
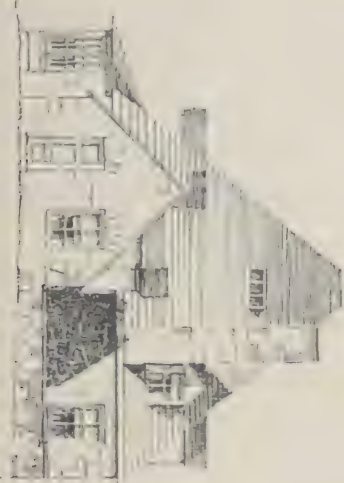
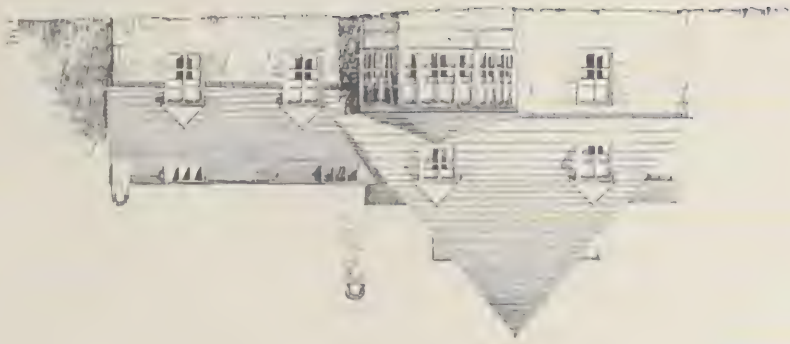
While it is not to be expected that our people in general will change their habits sufficiently to obtain a realization of the true delights of the garden, yet there are many who would gladly do so if they only knew how to go about it. These should understand, that almost any house plot is large enough for the purpose, provided the house is not placed so as to spoil it. Let the house stand so that it may present one front to the public, and let the other side be reserved for the private outdoor life of the family. Use the house as a screen to protect the garden from the inquisitive gaze of the passer-by, and enclose the other three sides of the plot with walls, fences, hedges, or in other ways sufficiently to secure that degree of privacy to which every family is properly entitled. When this is done one has prepared the way for the realization of one of the greatest pleasures which life can afford—the possession of a garden in the true sense of the word.

Plate 4

This design is illustrative of much that has here been said, for the house stands directly at the roadside; which is bordered by a bank of earth about 4' high, and the building acts as a screen for the garden which is back of it. The main entrance to the house is reached by a short flight of steps from the road to a small flagged court. This court is in the angle formed by the main body of the house and a one-story wing containing the entry, kitchen, and pantry. The living-room and dining-room are *en suite* and extend through the building; the end of the dining-room projects beyond

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



Roadway of Flagg Place



Plan of Lower Floor



SMALL HOUSES

the general line of the garden front and is enclosed in glass. Two masters' bedrooms and a bath are also on this floor. On the floor above are two more masters' bedrooms and two servants' rooms; each pair has its own bathroom.

The kitchen is the only room in the house having the usual ridge-dormer treatment. The other rooms of the ground floor have horizontal beam ceilings of the kind described in the article on floors and

ceilings, XXX. The slope of the roof appears in the ceilings of the rooms of the upper floor. Above these rooms is a small roof story for storage purposes which should, however, be provided with a more liberal supply of roof-dormers than indicated.

The design was suggested by an old house known as the "Governor's House" at Coucy-le-Château, a photograph of which is here-with reproduced.



No. 6

Old building known as the "House of the Governor," at Coucy le Chateau, France.

TRUTH

ONE excellent way to save money in building is to tell the truth: that is, to let things show for what they are, and save the cost of making them appear to be what they are not. If this were done generally in the United States the gain, both economic and artistic, would be colossal in its proportions.

To say that design and construction in building should go hand in hand, is to state a truism so self-evident as to seem trite in the making; nevertheless, all about us, here in building, one sees the contrary.

Architecture is artistic construction. How, then, can the construction be one thing, the artistic representation another, and the result still be architecture? A combination of that sort produces scenery, not architecture.

In many of our most important works the construction has nothing to do with the part that meets the eye except to hold it in place. Such designs violate the very fundamental laws of art. They are unreasonable, which good art never is. Art without reason is a counterfeit which, however it may impose on the unthinking at the time when made, is sure to be detected and condemned at a later date, as unworthy of admiration.

The somewhat meaningless columns and arches with which Roman amphitheaters were decorated, and the true construction disguised, are not considered admirable; neither are those façades of eighteenth-century churches, which have little to do with what is back of them. The constructions which do win and hold the admiration of mankind are those which, like the Parthenon at Athens, Saint Sophia at Constantinople, and the Cathedral at Amiens are simply artistic construction—that is, true architecture. In each of these buildings, and in all others of the same class, it is the construction which is beautiful, just as it is the construction which is beautiful in the human figure. Nothing is disguised, nothing hid; every member has its use and is designed for that use. Such structures appeal to our taste on reasonable grounds: they ring true; they are works of architecture, not scenic effects.

In many high buildings, and most notably in our great railway stations—structures which of all others should be modern, for they belong exclusively to this age—one sees design and construction divorced, each playing a different rôle, the construction contributing nothing to the design and the design telling nothing of the construction. In some the design has nothing to do even with the present age, but is archæology pure and simple. Perhaps the strangest thing about these solecisms is that some of the worst are by the very men who stand highest in the profession as architects; so deep-seated is the evil and so far have we strayed from the true course in art!

In building, indeed, we are fast becoming a nation of liars. On every hand one sees the grossest attempts at deception, often carried out on a monumental scale and at enormous cost. During the past twenty years there has been a veritable epidemic of this sort of thing. Of most of the great structures which have sprung up, as if by magic, during that time, one may almost say, there is nothing genuine about them but the part hidden from view.

This blight of attempted deception is the result of the introduction of the steel frame and the supposed necessity for hiding it.

The builders have found it easier to cover the frame by the use of old architectural forms, never intended for such use, than to invent new ones suited to, and derived from, this new way of building. The habit of deception thus engendered has had a disastrous effect on public taste; fraud in design has become chronic; one hardly expects anything else. No one expects columns to support what they seem to support; no one expects walls to be real walls; every one knows that what often seems massive masonry is, in reality, only a cloak or veneer intended to hide and disguise the real construction—the steel frame—and that materials masquerading as stone may be terra-cotta, cement, sheet metal, or something else. If one sees a great colonnade or arcade crowning some lofty structure, he is not foolish enough to suppose it indicates what it appears to indicate, and that behind it are apartments of corresponding importance; he knows, or at least suspects, it to be simply a part of the general scheme of camouflage for the steel frame. If he sees two or three hundred feet of what seems to be massive wall resting on a delicate arcade of classic design, he is not disturbed; for he knows the arcade will not be crushed, except in appearance, by the towering mass above it. If he enters a railway station and sees huge piers or columns of masonry, apparently supporting the roof, he will not be surprised on descending to a lower level to find no trace of them except in the steel frame. If he sits beneath what appears to be a beam ceiling, at the house of a friend, he no more expects the beams to be real beams than the pipes of the organ he sees in church to be real pipes.

And so it is all the way through—architectural features are no longer architectural features but bits of scenery—stage effects—intended to deceive the beholder and make him think them something they are not. The disadvantages of these methods are: that they pervert taste, by destroying our sense of the fitness of things, are wasteful of energy and materials for which a better use might be found, and are in direct conflict with honesty and good sense. Those who follow such practices will, sooner or later, find their work in that state of disrepute to which it properly belongs. Even if public taste in this country is so low as to admire that sort of thing now, there must sometime be an awakening; a reaction against it is long overdue. It is inconceivable that a community like this can continue long to think admirable practices directly opposed to the fundamental laws of good art. Is it any wonder that foreigners of refinement find little in our construction to admire and nothing to imitate; and that they do not hold corresponding views to our own as to the high state of our civilization? *

In saying this, the writer has no desire to pose either as a purist or as having no sins of his own to answer for; one learns by experi-

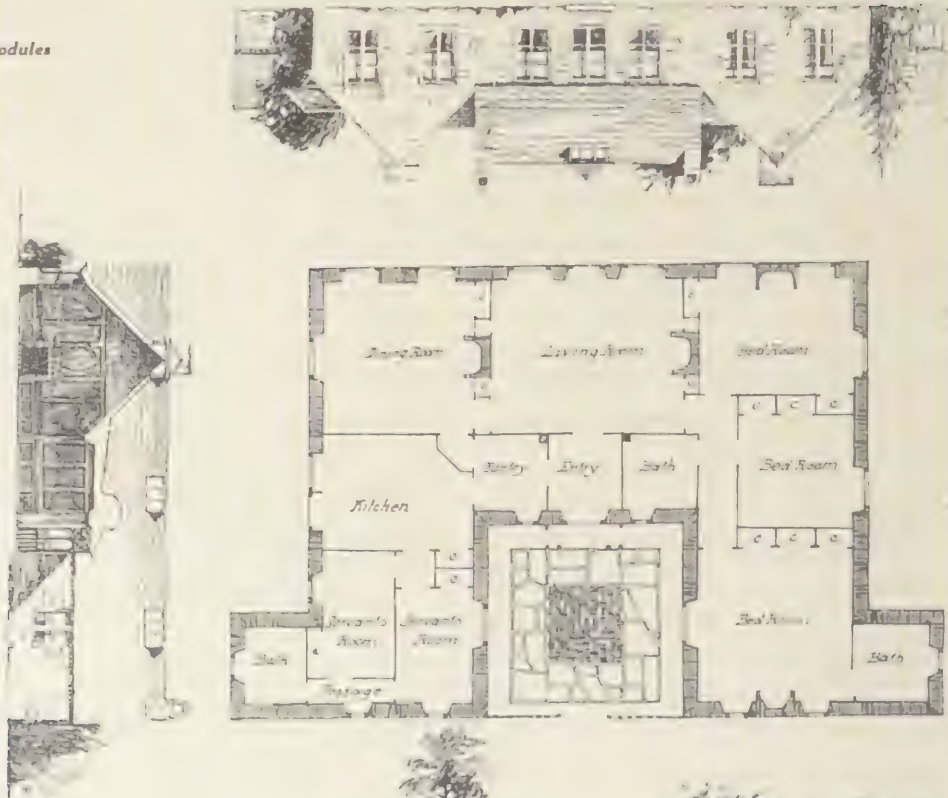
* By a strange irony of fate one of the buildings for which the writer was architect has been provided with a striking example of this kind of architecture. In making changes in the hemicycle, the trustees of the Corcoran Gallery of Art at Washington have, in their wisdom, seen fit to bring that part of the building into line with present-day American methods of designing by introducing a row of what pretend to be Grecian Doric columns, but which might be called hollow mockeries, since they are meaningless constructions, each one consisting of a shell of plaster, or similar compound, which supports nothing more weighty than itself, and which serves no other purpose than to cumber the floor. The walls too have been made to harmonize with the columns by covering them with what purports to be rusticated stone work, but which is in reality a tasteless counterfeit of it in plaster. One seeing this room, and unacquainted with the fact that it was done without consulting the original architect, might think his practice at variance with his precept.

Houses for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

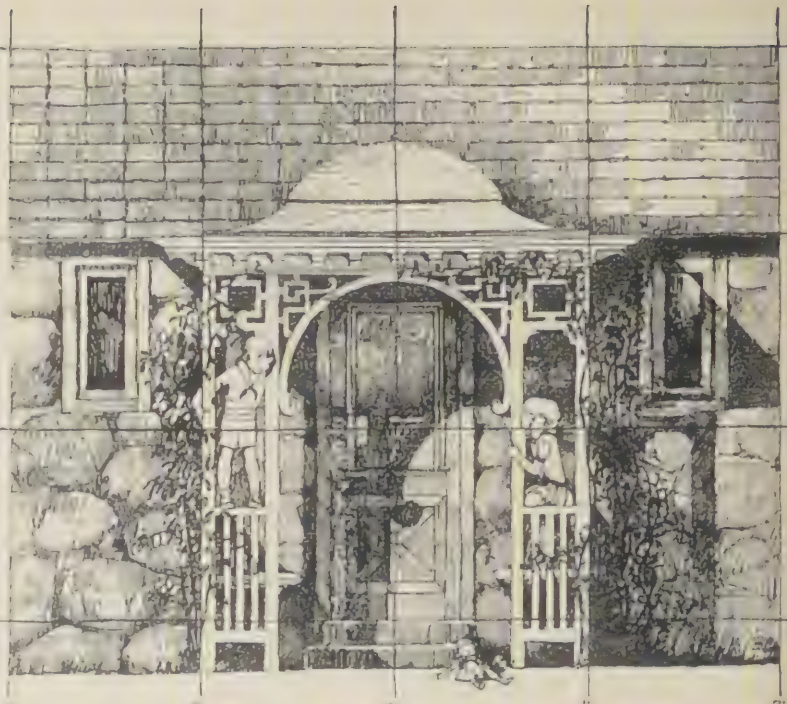
No. 5

Table of Modules

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2		- 7'-0"
3		- 11'-3"
4		- 15'-0"
5		- 18'-0"
6		- 22'-6"
7		- 26'-3"
8		- 30'-0"
9		- 33'-9"
10		- 37'-6"
11		- 41'-3"
12		- 45'-0"
13		- 48'-9"
14		- 52'-6"
15		- 56'-3"



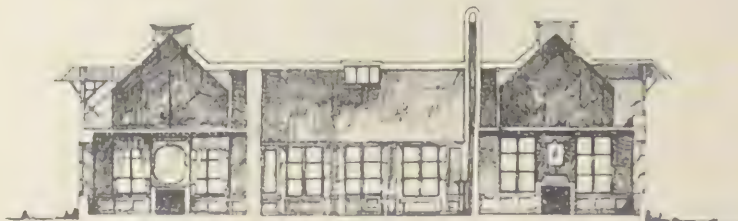
HOUSE A.



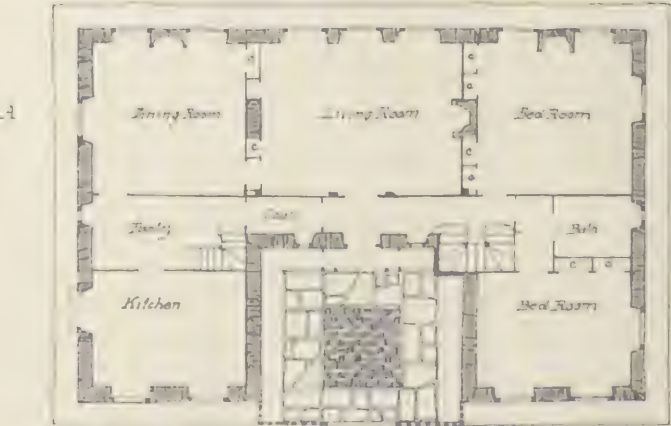
HOUSE B.



Plan of House B.



Section of House B.



SMALL HOUSES

ence, and experience in design teaches nothing more important than to think straight.

While the dwelling does not present so wide a field for deception in design and construction as the commercial building, yet it is by no means free from it. A considerable part of the cost of almost every house is due to the use of labor and materials which are employed simply to hide or disguise the real construction, and which add unnecessary inflammable material and detract from available space.

To eliminate all such unnecessary stuff has been one of the chief aims in these houses; and the saving thus effected has proved one of the principal aids in reducing their cost.

Plate 5

The two designs of this plate represent two plans much alike; but one house has only a single story, while the other has two stories in part. The entrance to each house is preceded by a little court formed by the building itself. The various departments of the house are well segregated in each case. The service department and dining-room occupy the left wing, the living-room the center, and the bedrooms the right wing. Both houses have a comfortable appearance, especially house *A*, which nestles so close to the ground as to seem hardly consistent with proper head room inside; but there is, in reality, no lack of it.

MOSAIC RUBBLE

Of stone one may say—it is, always has been, and always will be, king of building materials. Any process tending to reduce the cost of stone walls is worthy of respectful consideration. The method about to be described is one of that kind.

Some of the advantages accruing from the use of ridge-dormers or their equivalent have already been pointed out, and among them reduction in height, economy of space, a consequent gain in appearance, and saving in cost; but these and the many other benefits are largely dependent on the use of masonry walls. The lateral walls of the building should be stiff enough to resist the thrust of the rafters without tie-beams; and to obtain this strength masonry is necessary. The walls may be of stone, brick, or cement; but of these three, stone, if properly laid, is much the better-looking and, where abundant, cheaper than brick.

Low walls are much less expensive to build than high ones. When the wall is so low that the stone may be placed in it from the ground, the work goes on fast; but when it becomes necessary to hoist materials and work from a scaffold, speed decreases and cost increases. It has therefore been the aim, in designing these houses, to keep down the height of walls, and we have seen how greatly the ridge-dormer helps one to do so. Where that feature is used, the lateral walls need be only about 5' high for single-story and 12' for two-story houses. This lowness of walls is an important element of economy both on account of the reduced amount of materials required and the greater speed in construction.

The method used in building the walls of these houses, so far as the writer knows, is new. It is more speedy and economical than common methods, produces a better-looking wall than ordinary rubble, and most of the work may be done by unskilled labor.

The walls are made by placing stones in forms, with the flattest side flush with the outer face and shoveling in concrete behind them. No mortar is placed between the stones as they are laid in the forms, but they are put in dry, like pieces of mosaic, and mortar is squeezed into the joints afterward, when the forms are removed.



No. 8

Sleepers imbedded in masonry. At the left some have been driven out and holes plugged. Runway for hoisting materials partly in place. Forms removed at left corner.

Therein lies the chief novelty.

In work of this sort economy of construction is dependent on economy and convenience of forms for the masonry, and scaffolding and runways for handling materials. With good forms, scaffolding, and runways, one may say the work is half done. Those used for these houses are of that kind.

The most common way of making forms for such purposes is to nail boards to wooden uprights. The lumber is thus practically wasted for any other purpose and the cost is so great that the saving which should result from the forms is, in great measure, lost.

By the method used here there is no nailing and no waste. The lumber is uninjured and may be used over and over again for the same purpose. Moreover, comparatively little of it is needed; and forms, scaffolding, and runways may be set up most easily and quickly.

The method of procedure is as follows:

First. The foundation walls are constructed in the manner described in the article on "Foundation and Cellars," and finished off true and smooth at the level of the damp-proofing, which is the level of the concrete underfloor and 2" below the finished wooden floor. On this smooth surface the module lines are marked.

Second. Crosspieces, slightly tapered toward one end and greased, are laid on these walls at the half-modules (see Photograph 7). They have holes near the ends which receive iron pins in the feet of the uprights. These sleepers become embedded in the masonry, but, being tapered and greased, are easily driven out when no longer needed (see Photograph 8).

Third. Uprights (4" x 4") are erected on the sleepers just described. They stand on either side of the proposed wall, at a sufficient distance from its outer and inner faces to allow space both for the planks which are to hold the stone and cement in place and also for battens about 1" square in cross-section, and 2' long, called release sticks (see Photograph 9). The uprights have holes bored through them at one side of their central axis, at 6" intervals from top to bottom (see Photograph 10). In setting the uprights, the corner ones are erected first and temporarily braced to stakes driven in the ground. Thus placed, they act both as guides and braces in setting the others. When all are in place the temporary braces of the corner uprights are removed and others applied which are bolted to the neighboring uprights on each side (see Photograph 7). The corner uprights usually stand on the ground.



No. 7

Sleepers and uprights resting on finished foundation wall. Corner bracing. Diagonal horizontal bracing. Window and door frames in place. (Note anchorage battens.) Window forms for splayed jambs. Alignment trusses.

SMALL HOUSES



No. 9

Wall under construction. Inside of form. Flat sides of stones in line with outer face of wall and concrete backing. Release sticks between uprights and planks. Tension wires stiffening uprights. Spreaders to hold planks in place. Window frame and form against which masonry stops.

rights; and braced horizontally by strips at the corners of the building from one frame to another; and, where the span will permit, across the building (see Photographs 7 and 11). These strips act both as struts and ties, maintaining the frames and consequently the uprights, in proper position.

Fourth. When the uprights are set as above described, planks are laid against them forming a sort of trough to be filled with the stone and concrete. At the start the trough is usually two or three planks deep and others are added as needed (see Photograph 11). The first planks rest on the sleepers. The planks do not come in direct contact with the uprights, but are separated from them by the release sticks, above mentioned. They are held firmly against these sticks by short pieces of wood, called spreaders, slightly longer than the proposed wall is thick, and which are shoved in between the planks to hold them apart and in place, until the masonry is begun, when they are taken out (see Photograph 9).

When the form is ready unskilled laborers place the stones with their smoothest side against the planks, which are in line with the outer face of the wall; while others shovel in concrete behind them (see Photograph 9). No mortar is used between the face stones at this time, as has been said. They are simply stood in dry, care being taken to keep the face of each stone flat against the outer planks.

From time to time as the work proceeds—that is to say, at every third plank—"tension wires" are applied. Stout wire is looped about every pair of uprights and twisted to make it taut. Both the wire itself and the stick used in twisting it become embedded in the wall and are left there; only the projecting ends of the wire being cut off when the uprights are removed. These wires serve to prevent the uprights from bending under the pressure of the soft concrete, thus keeping the wall truly in line, and they securely anchor the uprights to the wall so that other uprights may be stood on top of them when the wall extends beyond the lower tier (see Photograph 9).

Fifth. After the wall has proceeded to any convenient height, the lower planks, which acted as a form to hold it in place while the cement was setting, are taken out for use at a higher level. This is

The others are held in place at the bottom, as has been said, by pins set in their feet and which fit into corresponding holes in the sleepers; and at the top by light frames called alignment trusses made of parallel strips (2" x 4") with cross-bars, against which the uprights rest, and diagonal braces (see Photograph 10). The uprights are held securely against the alignment trusses by wires looped about each pair and twisted to make them taut (see Photograph 11). The frames are supported, at a convenient height, by pegs in the holes of the up-

easily done by knocking out the release sticks from between the planks and the uprights, which loosen the planks so that they may be drawn out. But before doing so it is necessary to prevent the upper planks, which have rested on the lower ones, from falling down when their support is thus removed. This is done by means of short, sharply pointed spikes, called toggle-pins, which pass through the holes of the uprights and engage the planks directly above those to be removed. A slight tap on the pin is sufficient for the purpose (see Photograph 10).

By this arrangement, comparatively few planks are needed, because, as soon as the cement sets, the lower ones may be removed and used at a higher level. In actual practice the planks are taken out daily as the work proceeds.

When the planks are removed, the wall presents a somewhat unsightly appearance, as may be seen by Photograph 10, and it is hard to realize how beautiful it will become when the pointing is done. Notwithstanding its rough appearance in the photograph, the faces of all the stones are truly in line and the wall when finished will present a singularly attractive appearance altogether unlike any other rubble masonry with which the writer is familiar. Photograph 12 shows the masonry before and after pointing. In obtaining this result, much depends on the way the pointing is done. The mason takes cement on his mortar-board, holds the edge of the board against the wall, and shoves the mortar into the joints so that they are completely filled. He then, with his trowel,



No. 11

Tension wires near top of uprights holding them in place against alignment trusses. First planks in place at right. Window form set, but frame missing. Supports for scaffolding bolted to uprights. Inner forms removed at right. Form for gable end wall in place. Horizontal tie across building.



No. 10

Holes in uprights. Toggle-pins preventing lower planks from slipping down. Alignment truss dismounted, others in place.

SMALL HOUSES



No. 12
Mosaic rubble before and after pointing. Gable end wall plate.

rights, which stand within the building, are removed as the floor beams are set, and re-erected at the higher level, resting on those beams. This is very convenient, because it is not always possible to withdraw the planks, inside the wall, in the manner above described, on account of the re-entrant angles of the walls; as, for instance, the lower planks in the gable end wall shown in Photograph 11.

Seventh. When the inner uprights are thus removed, the alignment trusses, above described, which braced them at the top, are dismantled for use at a higher level. The outer uprights, which remain in place, are now sufficiently braced by the wall itself, each one being anchored to it in several places by the tension wires, as above explained, and by the sleeper on which it stands. The second tier of outer uprights are stood on top of the first tier; the pin in the bottom of each being received in a corresponding hole in the top of the lower upright. This process may be repeated as often as necessary (see Photograph 14).

Eighth. Where window, door, or other openings occur in the wall,

squeezes fine stone chips into the wet cement (see Photograph 13). This is much faster than smoothing the joint with a trowel in the ordinary way, and gives to the work a beautiful soft aged appearance, which must be seen to be appreciated. Indeed this masonry, mostly made by unskilled mechanics, is worth a pilgrimage to see by any lover of good stone work. Of its kind, it is unsurpassed for beauty.

Sixth. When it is desired to carry the work to a greater height than a single story, the up-

forms are set up against which the masonry stops. The form, with the permanent frame for the opening, together occupy the full space between planks, *i. e.*, the full thickness of the wall. The forms are splayed and may be easily drawn out when the planks are removed; but the frame has anchorage members which become engaged in the masonry and hold it permanently and securely in position (see Part XII and Photograph 7).

Ninth. If furring is required, plaster-boards are placed against the planks on the inner face

of the wall. The plaster-boards stick to the concrete and the plaster sticks to the plaster-boards; which latter are usually sufficiently non-conductive of heat to prevent condensation.

Tenth. It will be seen, from the photographs, how useful the uprights are in making scaffolding and runways. After the walls become breast-high, if the building is very low, it is built from the inside with scaffold supports of the kind shown in Photograph 11. When the walls are higher the scaffolding is attached to the outer uprights. The uprights are equally convenient in building runways for taking material to the higher levels. One partly in place may be seen in Photograph 8. The holes in the uprights greatly facilitate the work.

Although it has taken a great many words to explain, this operation is really simple and convenient. All parts, being governed by a fixed unit, are interchangeable and may be used in any part of the building; or in any other building where the same standards prevail. Walls may be built by this method far more cheaply and speedily than by any other with which the writer is acquainted.



No. 13
Mosaic rubble finished, being part of same work shown in No. 10.

Plate 6

This six-room house has no dining-room. It is intended for a family which does its own housework, although there would be excellent accommodation for a servant on the upper floor, if one were wanted. There is a little pantry between living-room and kitchen. The living-room is of liberal dimensions, as it must serve as dining-room also. On one side of it there is a broad alcove with window-seats. Two bedrooms and a bathroom are on this floor. The kitchen has a door and window to the rear of the building. As it is not intended to have a cellar, a storage wing will be provided, easy of access from the kitchen. For this purpose it is proposed to extend the part containing the two bedrooms of the ground floor, back as far as necessary to afford ample storage space for fuel and other purposes. Such a wing might be 50' long and still cost much less than a cellar under the whole house.

This design illustrates an expedient, used in several others, to obtain sufficient height for the porch roof against one of the low wings, where the house wall would otherwise be hardly more than 4' high. Here the wall coming underneath the porch roof is carried up to meet it and the roof extended until it meets the sloping plane of the wing roof.



No. 14
Superimposed uprights. The garage and water tower of Plate 17 under construction.

Table of Modules

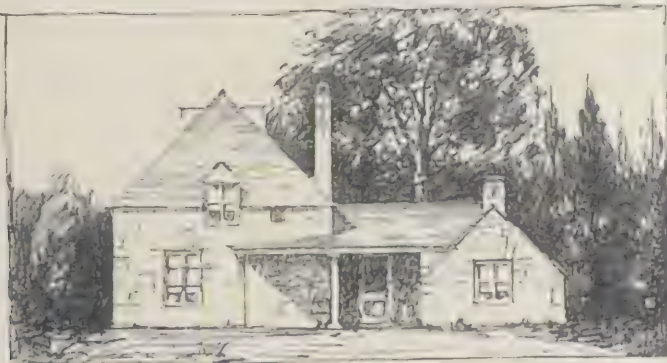
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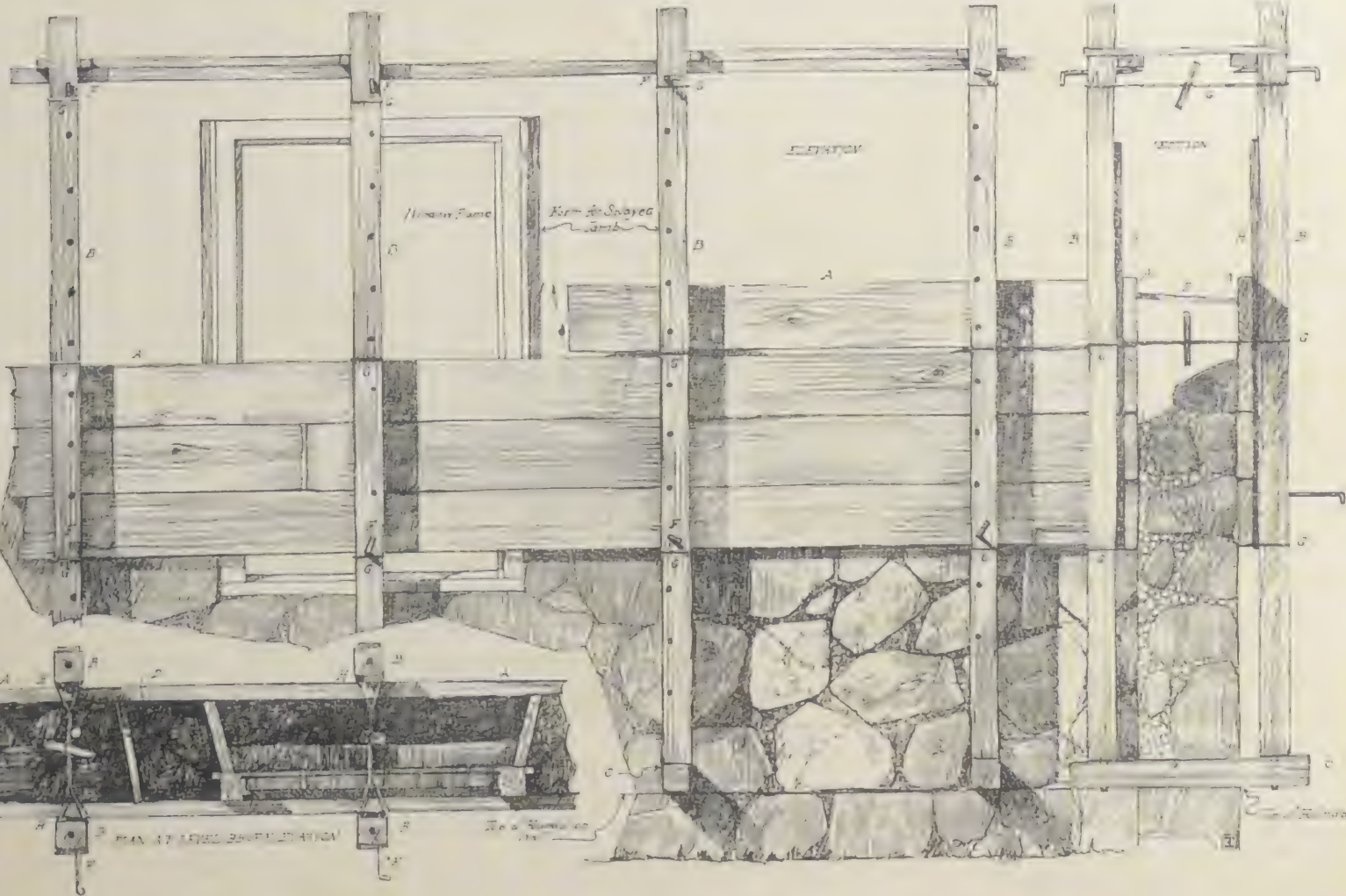
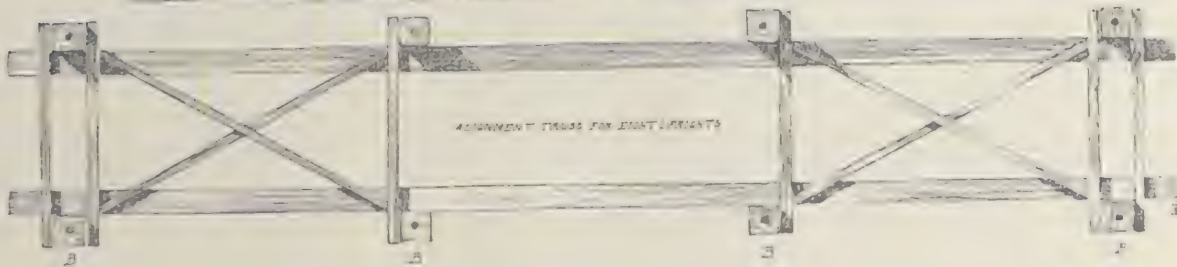
Plan of Upper Floor



Section on Line of Roof Plan



FORMS FOR MOSAIC RUBBLE
SCALE - 1" = 5'
16 Parts - 1 Module
A. Forms
B. Scaffolding
C. Scaffolding
D. Spreaders
E. Alignment Trusses
F. Ties and Pins
G. Anchorage Wires



VII

PLANNING

A CHIEF cause of waste in building is due to unskilful planning. One who has not made a careful study of the matter can hardly realize how great a difference there may be in the relative economy of two plans which, to the casual observer, seem much alike. The amount of money lost yearly in the United States through unskilful planning would be staggering if known.

Every one will admit that in planning houses of the kind we are considering, the designer should have three main objects constantly in view, viz.: beauty, convenience, and economy; but most people here would place beauty last on the list, as of least real importance.

In our programs for architectural competitions, æsthetic requirement follow all others on the list. They are treated almost apologetically, as if concessions to an impractical taste which some people affect, but which are in themselves of no real importance. Perhaps this feeling is partly due to the quality of many of the samples of so-called art which abound here. But true art is most practical; its very foundations rest on reason or common sense, and to make light of it is either to exhibit the instincts of the barbarian or the wisdom of the fool. In a work of construction made by civilized creatures, beauty should hold first place; for beauty depends on fitness, and fitness includes all practical considerations. Therefore, instead of convenience, economy, and beauty, we write "beauty, convenience, and economy."

In no other way can the first of these objects be so well and surely attained as by applying the fundamental laws of good taste or the correct principles of design; for it costs no more to build in accordance with them than otherwise. Indeed, it often costs less, for vast sums, in the aggregate, are constantly being wasted in vain attempts to obtain beauty which might easily be had, with no such effort or expense, if the designer only knew how. It is most economical, therefore, to employ for the design of buildings, no matter how humble, only those who have received proper training in design, and who understand how to apply what they have been taught. In this country the vast majority of those to whom this work is entrusted, are sublimely ignorant on the subject, whereas in France, where the importance of the matter is better understood, the supply of competent designers, trained at government expense, is always abundant—a condition resulting in great economic gain to the nation.

To arrange the house conveniently, it is necessary for the designer to have constantly in mind the proper relationship which should exist between the various departments which go to make up the home. Those divisions ordinarily are: 1st, the public part, if it may be so called—the part to which friends and visitors are admitted—including the entry, living-room or rooms, and the dining-room; 2d, the private part, consisting of the sleeping-rooms and their dependencies; 3d, the service department, including all parts used or occupied by the servants, whether indoors or out, as the kitchen with its dependencies, laundry, yard, etc.; 4th, the means of communication, such as corridors, passages, stairways, and the like; 5th, places for the storage of household effects, fuel, trunks, and wearing apparel; and 6th, those parts which provide for the outdoor life of the family, as porches, verandahs, lawns, gardens, and walks.

It is in the fourth of these items where the greatest economies can usually be made. Means of communication are, of course, necessary, but if separate are of no value for any other purpose; and if com-

munication could be had without them usefulness would not be impaired.

It is therefore highly important, where economy is necessary, to reduce the area devoted exclusively to communication to the limit of practicability; not, however, by pinching but by elimination. Corridors cost as much to build and maintain as if the space they occupy were in rooms; indeed, they cost more, because the percentage of wall surface to floor area is greater. The skill and ingenuity of the planner can nowhere so well be shown as in reducing the length of corridor without loss of convenience; that is, indeed, his chief problem. Any one can plan with a liberal use of corridors, but it requires skill and ingenuity to plan conveniently without them. As in everything else, the French are extremely economical in planning; and vast sums are saved to the nation by the careful and scientific training which all French architects receive. In the typical French apartment plan corridors are restricted almost to the limit of possibility; several of the rooms are reached in two ways through other rooms and without a corridor, an arrangement perfectly satisfactory to American families living in French apartments, but which we seldom think of using here.

In many old French buildings corridors are almost unknown, the rooms of the upper floors being reached either by passing through other rooms, or by small spiral staircases from the ground floor, which take up little space and are tucked away in odd corners or in turrets; an arrangement both picturesque and economical.

In the designs of this series, great economy has been aimed at in the use of corridors. In general, the space devoted to circulation, including stairways, corridors, and passages, seldom exceeds 10 per cent of the total floor area in single-story houses, or 12 per cent in two-story houses, and is often much less; while in some of the very small houses corridors are entirely eliminated.

In the arrangement of that part of the house which we have called public—though it is public only by comparison—the greatest care should be taken to provide sunlight. The morning sun is particularly desirable for the dining-room. The public part should be contiguous to the main entrance, the rooms grouped by themselves, convenient of access from the bedrooms but entirely separate from them. There should, indeed, be a very distinct separation of the public, private, and service parts of the house. But it is not always best to place all the masters' bedrooms in a single group. It is often more desirable to have them in two groups, somewhat separated from each other but equally secluded from the public part. Guest-rooms are better if not contiguous to the bedrooms of the family. Moreover, it is often desirable that children's rooms should not adjoin those of their parents. In these designs, therefore, the bedrooms are generally arranged in two groups, each with a bath.

Plans are frequently injured and much space and materials lost, by the construction of unnecessary partitions. One good room is often ruined for the sake of making two poor ones, which together do not answer the purpose for which they are used as well as would one larger room. Small houses are planned as if they were large ones, and subdivisions made which, however appropriate and convenient in a large house, had better be dispensed with in a small one.

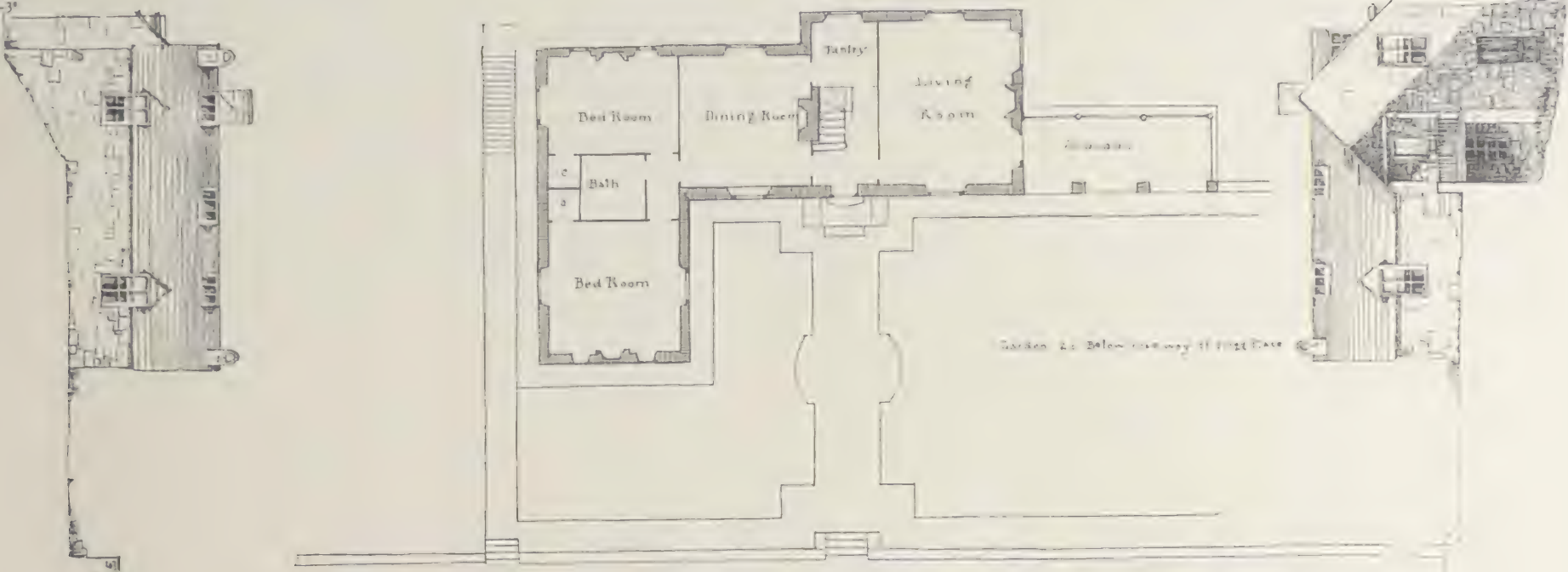
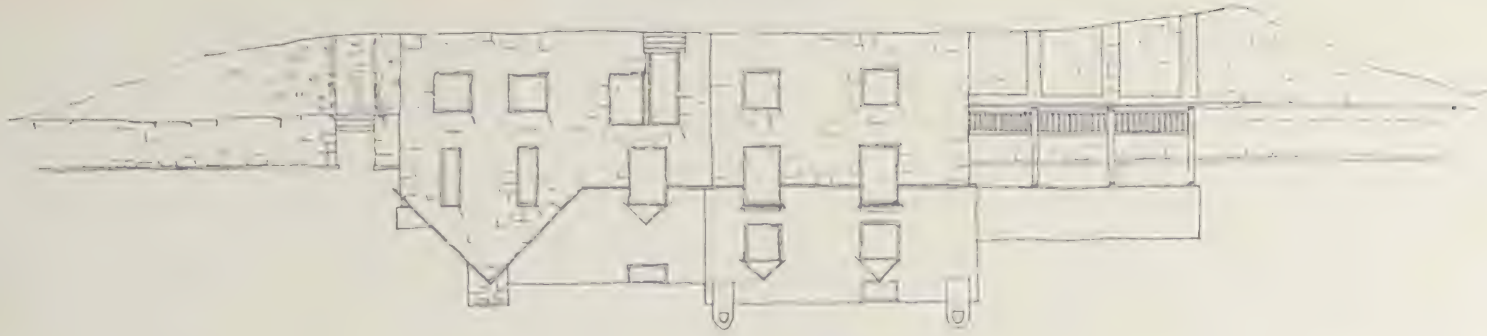
There is one subdivision, however, which the planner of the very

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

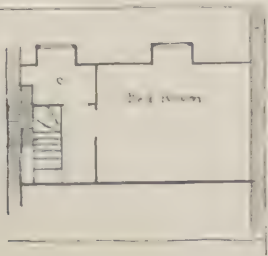
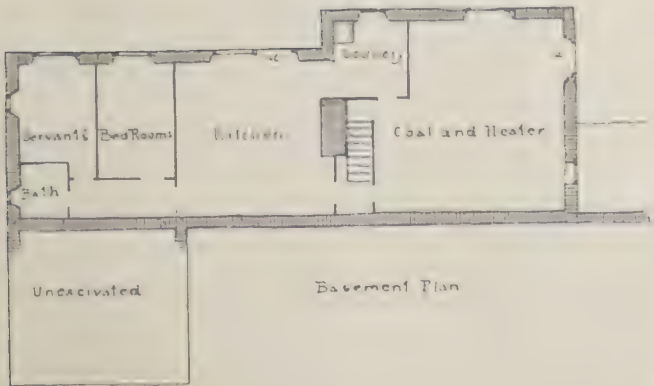
No. 7

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



Elevation on Flegg Place



SMALL HOUSES

smallest English house thinks it necessary to make, and which we seldom have, viz., the scullery. Every self-respecting English housewife requires a small place off the kitchen where pots, pans, and dishes may be washed and all other unsightly work connected with the *ménage* performed, and she is entirely right in this demand. The scullery is far from being wasteful; it is, indeed, a space-saver, for by means of it the usefulness of the kitchen is greatly increased. The actual work of cooking is neither unsightly nor uninteresting. In the very small house the kitchen, when relieved of all which is unpleasant about the preparation of food, is not a bad place to eat in, and the dining-room may be dispensed with. In houses of more importance, where two or more servants are employed, the kitchen, improved in this way, may take the place of a servants' dining-room, while in still larger houses a scullery should certainly be considered an essential feature. In many of the plans of this series the scullery is not provided, and they are defective, therefore, to that extent.

The provision of sufficient storage space is a highly important consideration, and particularly so in houses like these, deprived as they are of the usual attic space in the roof by the introduction of the ridge-dormer. Attics are often places for the accumulation of useless rubbish, but there must be, somewhere in the house, sufficient room for trunks and certain other necessary articles. Especially should there be an ample provision of closets—every bedroom should have at least one; besides which there should be a linen-closet, broom-closet, coat-closet, and as many more as possible. If, in building, every available nook and cranny were utilized as on ship-board, instead of being furred off and wasted, as it usually is, a great

many cupboards, most valuable in housekeeping, might be obtained with little additional cost, and the value of the house as a place to live in greatly increased.

Plate 7

This design is for a little house located at the crest of a steep hill overlooking the sea, along the top of which runs the road upon which the house faces. The building overhangs the hill-crest, so that, while only one story shows from the road, there are two on the other side. The strip of lawn between house and road occupies a small level area 2' or 3' below the roadway. Although the house is small, it is intended for well-to-do people, so two servants' bedrooms are provided. The main entrance, facing the road, is protected by a covered porch. To the right, as one enters, is the living-room, having windows on three sides, two of which overlook the water. At the end of this room, a door gives upon the verandah; which, with its pointed roof, continues the lines of the house and adds to its apparent size and comfort. On the ocean side the verandah floor is a full story above grade; but on the side toward the road, at the level of the lawn. To the left of the entry is the dining-room, the pantry for which is connected with the kitchen below by a dumb-waiter and staircase. Beyond the dining-room, and occupying a wing at right angles to the main body of the house, are two masters' bedrooms and a bathroom, each having a ridge-dormer. The lower story, which, owing to the slope of the land, is well above ground on the water side, contains the kitchen, servants' rooms, etc. There is also a small room over the living-room.

VIII

TASTE

ONE may safely say that the rudiments of taste are innate in all human beings. That is, all have a liking for what appeals to them as beautiful. It seems evident also that the development of taste is not due to heredity, but to cultivation or environment, which amounts to the same thing.

If these assumptions are correct, it follows that while taste is more or less of an artificial product, its seeds are always present and can, by cultivation, be made to bear fruit.

This is a matter of great import to the welfare of nations. If, by cultivation, a people may avail itself of the fruits of taste, then boundless benefits always lie within its reach.

At the present time France is, apparently, the only great nation which appreciates the value of public taste; or at least it is the only one which recognizes the fact that the cultivation of taste is a matter of high public concern, and consequently a legitimate and important function of government.

The cultivation of public taste by the government of France, even when considered from the purely commercial standpoint, is a most profitable operation. It opens up world-wide markets to French products and yields a thousandfold return to the nation on its cost, besides conferring inestimable benefits of a higher sort.

So long and so assiduously has taste been cultivated in France, and so deeply has its influence permeated the masses, that one is apt to think of refinement of taste as innate in the Frenchman; but the facts do not warrant such a theory. If it were true that a high degree of taste ran in French blood, then we should expect to see it manifest itself in offshoots from the parent stock, but this does not follow. There is nothing to show, for instance, that the taste of the people of French descent in Canada or Louisiana is of a higher order than that of the populations with whom they are in contact. The high development of taste in France must, therefore, be due to the influence which the home country exerts.

If other proof were needed to show that the development of taste is due to cultivation and environment rather than heredity, one may find it abundantly supplied by history. In the case of every nation which, at some time, has been conspicuous for its taste, one finds that when the stimulus which fostered it was removed the phenomenon ceased to exist.

If it is true that the development of taste is due to cultivation, then the converse must be true: that the neglect of taste must lead to its decline; of this too, history affords abundant proof.

It is unfortunately true that public taste is not cultivated in the United States. That is, no general effort is made in that direction. The state does nothing about it, and what encouragement art receives is sporadic and from private sources.

That public taste here is at a low ebb is conspicuously apparent. Offenses against it meet one at every turn. We do things by public agency, and permit things to be done by private interests, which a people who valued taste would not do nor permit to be done. We have allowed our cities to be disfigured by high buildings, not only without protest but with general approbation; we have been willing to sacrifice the beauty, proportion, dignity, and order of our streets to the monumental greed of abutting property-holders. Whether we choose to admit it or not, return on the investment outweighs any æsthetic consideration. That the overwhelming majority of

the people place financial gain or expediency above the dictates of taste, is conclusively proven by what one sees everywhere in our cities. Innumerable instances might be cited; but one or two recent ones will suffice as illustrations. In New York the municipality builds a great pier at the foot of Forty-sixth Street, costing millions of public money, and for some fancied benefit or convenience deliberately places it off axis with its approach. A costly viaduct is built, from Fortieth Street to the Grand Central Station, and for some reason, miscalled practical, does so in a way to rob it of any beauty it might have had. Yet no word of protest is heard in either case. Public taste is so broken and crushed that such things are taken as matters of course. But what can be expected in a place which permits a thing like the Cox statue to stand year after year on a city street, proclaiming, in language more convincing than words, the degradation of public taste?

This neglect, in the United States, is a great misfortune; it places a handicap on prosperity which, unless removed, will weigh heavily upon us as population increases and the struggle for existence becomes keener than it is now during the development of our almost boundless natural resources.

Owing to the enormous accumulation of wealth there is an immense demand for articles of luxury, and New York abounds with workshops where merchandise of great richness and beauty is produced; but when one enters these places and interviews the hands employed he finds, almost without exception, that the skilled workmen are foreign-born and trained. The American youth receives no teaching to fit him for those higher branches of handicraft; thus a potential asset of the first magnitude is lost to the country.

If, as we have tried to show, the spark of taste is alive in all human creatures ready to burst into flame if fanned by cultivation; if the possession of public taste is of inestimable value to a people and the reverse a misfortune, then the means by which this beneficent force can be made to function is worthy of profound consideration.

The world has witnessed several epochs when public taste, in certain communities, has risen to great heights. The two most remarkable occurred in ancient Greece, and in Italy at the time of the Renaissance. But the latter manifestation, notwithstanding its stupendous importance, was but the reflection of the former, and the development of taste in ancient Greece, in the time of Pericles, stands pre-eminent as the highest mark ever attained by art on earth.

When one studies these movements he finds invariably, that their chief characteristic was the enthusiastic study of the beauty of the human form; and that advancement in taste and refinement was in proportion to the intensity of that study.

It is easy to understand why this should have been so, for if perfection in taste and the arts of design is ever to be reached, it must be by the study of the supreme model furnished by nature. The human form, as it should be, is the criterion of design. The old Hebrews likened it to the very image of God himself.

"In the image of God created he him; male and female created he them."

The Hebrews seem to have been afraid to portray it, and never excelled in art; but the Greeks were hindered by no such superstition.

Graven images, in human shape, were made without stint and

SMALL HOUSES

without measure; representations of the human form decorated almost every object of Greek handicraft, whether for the home or for the temple. On monuments, furniture, utensils of all kinds, on vases and wall surfaces; in public places and in houses, everywhere and in every material, whether of bronze, marble, stone, or clay, the ideal human form was depicted. How could a people, so thoroughly acquainted with nature's most perfect model, go astray in the design of other things!

If one seeks the cause of the intense interest in, and appreciation of, the beauty of the human form which occurred in ancient Greece, he is almost irresistibly drawn to the conclusion that it was inspired by, or at least largely due to, the influence of the Greek athletic games. These games were second in importance to nothing else in Greek life. They partook of a religious character. Time was reckoned by them. Monuments were erected to the victors; and the forms of the athletes were preserved in enduring bronze and marble.

In those games, and in preparing for them, in every corner of Greece and her colonies, the people saw uncovered the best specimens of the race, and learned to judge, the human figure; and to understand the relationship which exists between symmetry and beauty of form, and dexterity and strength. They learned to judge the lines of their athletes just as we judge those of our horses and other animals. Thus a knowledge and an appreciation of the fine points of the human figure permeated the masses. The desire to portray it took irresistible hold on every one who could hold a pencil or guide a chisel, as it always must do under similar conditions, and the search for perfection of form became a veritable cult.

Not content with the most perfect models to be had in actual life, the artists sought a degree of perfection hardly to be found in any single individual; they idealized or conventionalized the model and made statues of the gods in which faultless beauty was aimed at.

This intense and prolonged study of the beauties and refinements of the human body produced refinement in all branches of design. The eye acquired a power of discernment and an exquisite sense of beauty and proportion which has since been lost. All design and handicraft became instinctively beautiful, so that refinement of taste was reflected in even the commonest utensils of daily life; for all ranks of society were permeated by a desire for it.

We speak of the necessity for the encouragement of art. Under the conditions which obtained in ancient Greece, art needed no encouragement; it took possession of all, overmastered all, and was as the very breath of life.

Like causes produce like effects, and if any people ever reach the

pinnacle of taste attained by the Greeks, they must follow the road trod by the Greeks.

We have the same model which was the inspiration of Greek endeavor; but lack Greek discrimination; we show what ought to be hid, and hide what ought to be seen. We tolerate unseemly and often immodest displays of flesh in places, both public and private, while hiding so much of the forms of our athletes, when in practice, that the quality of their lines cannot be understood or appreciated.

The human form, in its perfection the most beautiful object in nature, is seldom what it should be and becomes most repulsive when misshapen or distorted. Indiscriminate exposure of it, therefore, is as much to be deprecated as the legitimate study of its beauties is to be advocated. Such displays are alike repugnant to good taste, modesty, and common sense. On the other hand, the proper exhibition of the best examples of the human figure, as shown in Greece, in the persons of her athletes in the arena, led to the most momentous development of art and refinement which the world has ever known.

Unwittingly we have taken the first step toward the goal pursued by the Greeks; athletic sports are now followed here almost with Greek enthusiasm. If we take the next step and learn to appreciate the intimate relationship which exists between perfection of form and manly prowess of all kinds, we shall have become fairly launched on the stream which swept the Greeks of old beyond all subsequent art endeavor.

Some may ask what bearing all this has on the design of small houses. Let such a one examine the kitchen utensils and other trivial objects of domestic economy found in Pompeii; there he will find his sufficient answer, and learn that taste, when it takes hold on a people, may affect everything of human make, from the most exalted to the most humble; from a Parthenon to a saucepan.

Plate 8

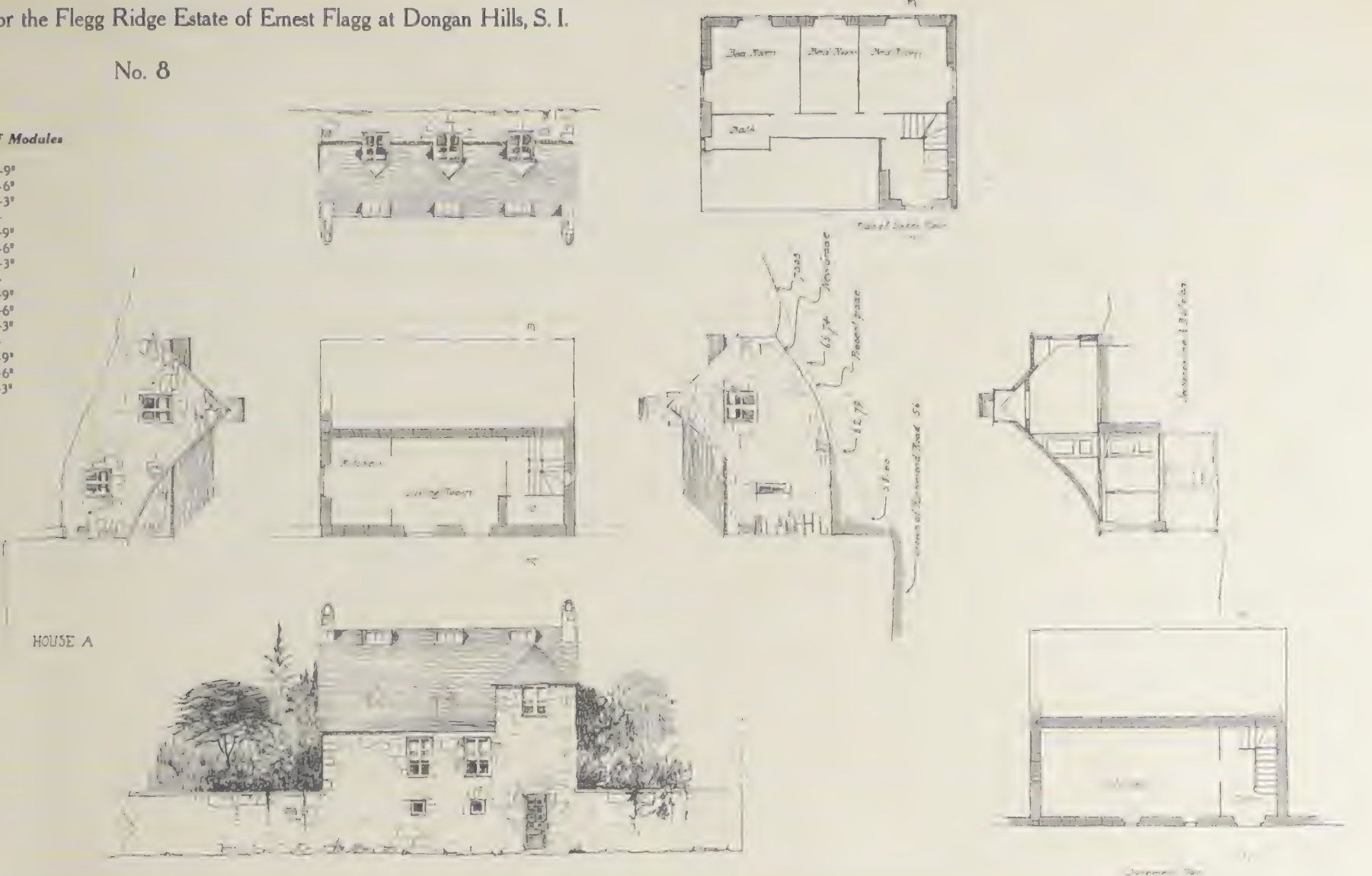
These two designs form part of a row of houses for the Richmond road, Staten Island (for the others see Plate 11). The hill rises abruptly from the road, which necessitates a retaining wall of from 4' to 8' high, which forms a base for the houses. In these two designs the accommodations are about equal; in general outline the plans are almost the same, but the internal arrangement and external appearance of the houses differ. In one the steps from the road are outside, and in the other inside the building. These houses are intended for people of the artisan class. Each one has five rooms, or their equivalent, and a bath; and also a cellar under part of the building. Like the more pretentious houses, they, too, are liberally provided with ridge-dormers.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

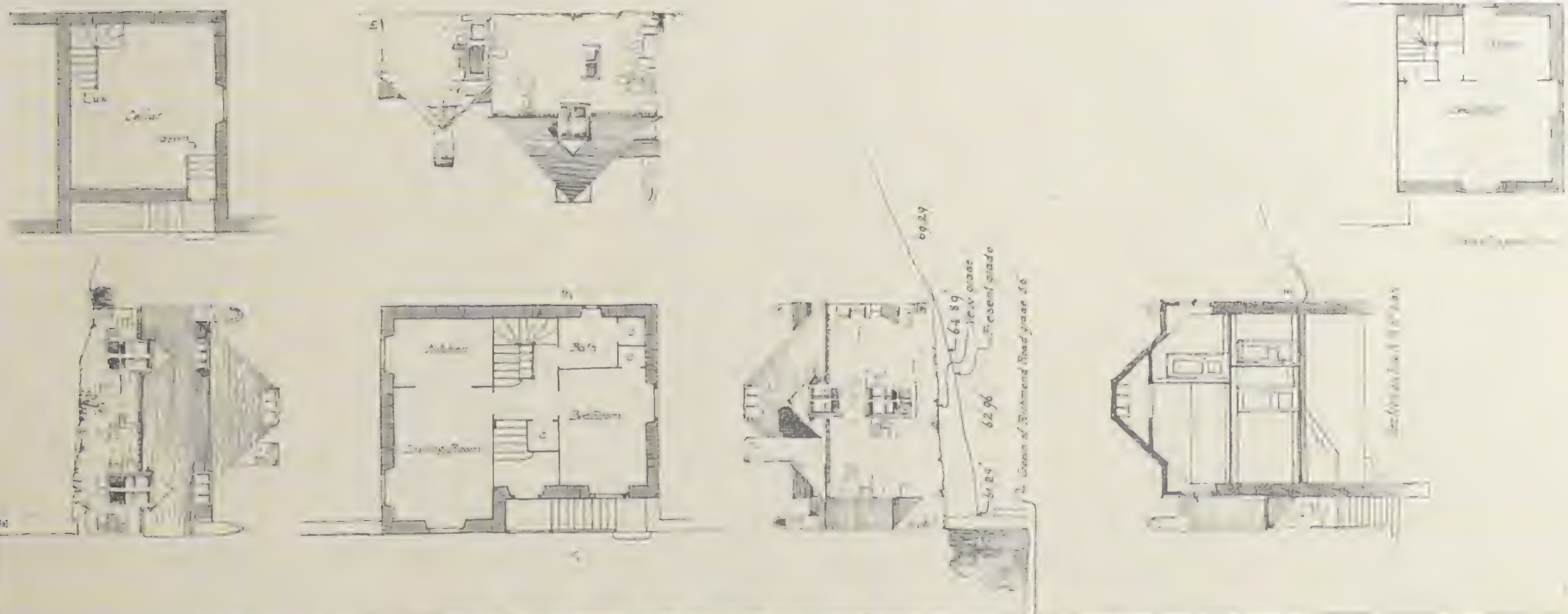
No. 8

Table of Modules

- 1 m - 3'-9"
- 2 " - 7'-6"
- 3 " - 11'-3"
- 4 " - 15'-0"
- 5 " - 18'-9"
- 6 " - 22'-6"
- 7 " - 26'-3"
- 8 " - 30'-0"
- 9 " - 33'-9"
- 10 " - 37'-6"
- 11 " - 41'-3"
- 12 " - 45'-0"
- 13 " - 48'-9"
- 14 " - 52'-6"
- 15 " - 56'-3"



HOUSE A



HOUSE B



PARTITIONS

IN those of these houses which have been built, the partitions were made by hanging a jute scrim or net and plastering both sides of it. The plaster was the ordinary patent plaster, such as is generally employed in New York. The partitions are about $1\frac{3}{4}$ " thick, of remarkable strength, and have proved satisfactory in every way. By their use all wooden studs and laths are dispensed with, and the cost of those materials is saved; also a great deal of inflammable stuff is excluded from the building. Such partitions are fireproof, for they contain practically nothing that can burn; vermin-proof, being solid; less subject to damage than partitions of the ordinary kind, the plaster being thicker and quite as sound-proof. Partitions for houses are usually made by setting up $2'' \times 4''$ studs, covering them on both sides with wooden laths and plastering with from $\frac{1}{2}''$ to $\frac{5}{8}''$ of mortar. When finished the house is thus equipped, on the line of every partition, with a series of flues lined with tinder, through which fire, once started, can spread with amazing rapidity. Such partitions constitute a chief source of danger from fire in most dwellings, besides affording ideal places for breeding and harboring mice and other vermin. As we all know, they are not sound-proof. The hollow air space between the studs is not a retardant of sound; confined air is, indeed, an excellent conductor of sound as shown by the drum. It is the plaster, therefore, which must be relied on for the exclusion of sound, and in the solid partitions that is $1\frac{3}{4}''$ thick as against $1\frac{1}{4}''$, at most, in the wooden stud-and-lath partitions.

In making these partitions, the jute is cut into lengths corresponding to the height of the partition, and secured top and bottom by staples; the selvage edges are fastened together, after the strips are in place, by twine with a bagging-needle. Loops are made about every $3''$, and the work is done quickly and easily. At door openings, and where the partition meets the wall, the jute is also fastened by staples. A jute curtain is thus formed, hanging on the center line of the proposed partition. It need not be very tight. The first coat of plaster is applied by two men working opposite each other (see

Photograph 15). There is no difficulty about this because the men can see through the netting. When only one plasterer is available, a laborer holds a mortar-board for him to work against. No bracing is used. After the first coat has set, the partition is stiff enough for plastering to proceed in the ordinary way.

The only purpose served by the jute scrim is to support the first coat until it sets. The strength lies in the plaster, not in the jute.

When the plaster is

first applied, the whole mass hangs limp and of course perfectly plumb. It is therefore not easy to build these partitions out of plumb, and great care must be used to place the base directly under the head and set all frames plumb.

The writer has built many experimental partitions of this sort, in each case using men who had never seen one of the kind before, but no difficulty was found in doing the work. Where great strength is required the first coat may be of Portland-cement mortar. Partitions so constructed have great fire-resisting qualities, as proved at an official test for the Building Department of New York. At this test a room about $8' \times 12'$ was formed, having smoke vents in the ceiling; the sides being made of partitions constructed as above described, except, of course, that no wood was used for fastening purposes. The room was filled with cord wood, soaked in kerosene, to a height of $2'$ and fire applied. The interior soon became a roaring furnace. After burning one hour a stream of water was immediately applied to the hot partitions delivered through a standard city hose at 40 pounds pressure, the nozzle being held $4'$ from the partition; except for a slight bulge and one small crack, they successfully withstood this test. How long, may one ask, would the more expensive wooden stud-and-lath partition stand under such treatment?

These partitions cost considerably less than ordinary ones, but this is by no means the real measure of their economy. Floor area in almost any kind of house costs at least \$6 per square foot. Six-inch partitions occupy $\frac{1}{2}$ a square foot of area for each running foot. That is to say, space which costs the owner at least \$3 to obtain. These thin partitions occupy not one-third as much, and the saving is proportional.

Thus for each foot of partition there would be an economy of \$3 in the item of space alone, over ordinary ones. Still another great source of economy is the reduced cost of interior trim (see Part XXI).

This way of making partitions is the final result of a good deal of study and experimentation on the part of the writer, starting from the solid metal-frame plaster partition as usually made. For many years solid partitions have been constructed by setting up light metal studs or rods supporting wire lath (see Photograph 16). It seemed as if the iron studs were not necessary for strength, and that wires might be substituted for them. The studs constitute the heaviest item of cost, are troublesome to erect, and much in the way of elec-



No. 15

Plasterers working against each other on wire lath.

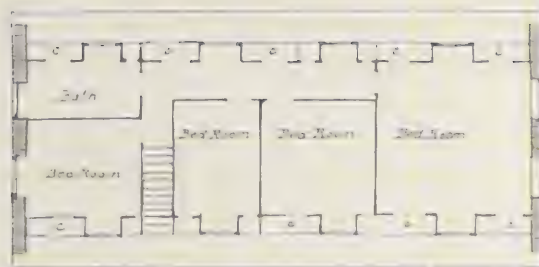


No. 16

Common method of constructing solid plaster partitions. Frame and lath ready for plastering.

Table of Modules

1	m	- 3'-9"
2	"	- 7'-6"
3	"	- 11'-3"
4	"	- 15'-0"
5	"	- 18'-9"
6	"	- 22'-6"
7	"	- 26'-3"
8	"	- 30'-0"
9	"	- 33'-9"
10	"	- 37'-6"
11	"	- 41'-3"
12	"	- 45'-0"
13	"	- 48'-9"
14	"	- 52'-6"
15	"	- 56'-3"



Plan of Upper Floor

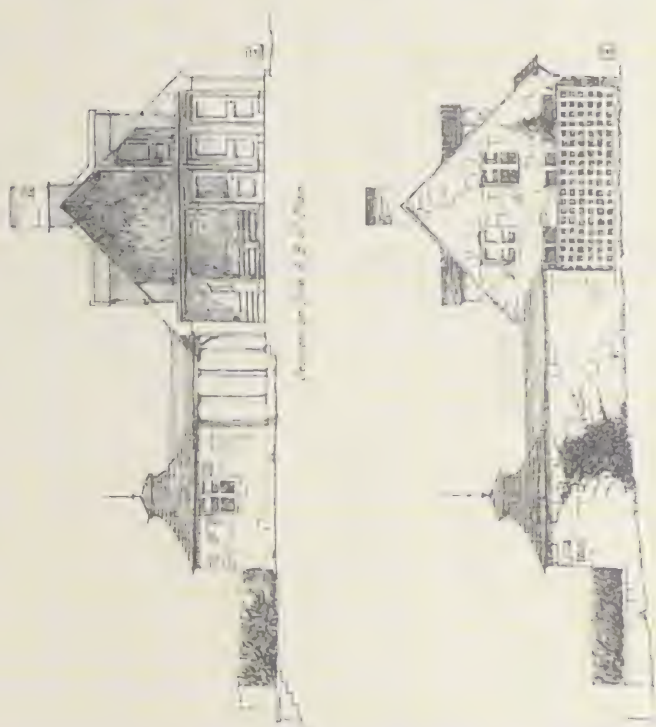
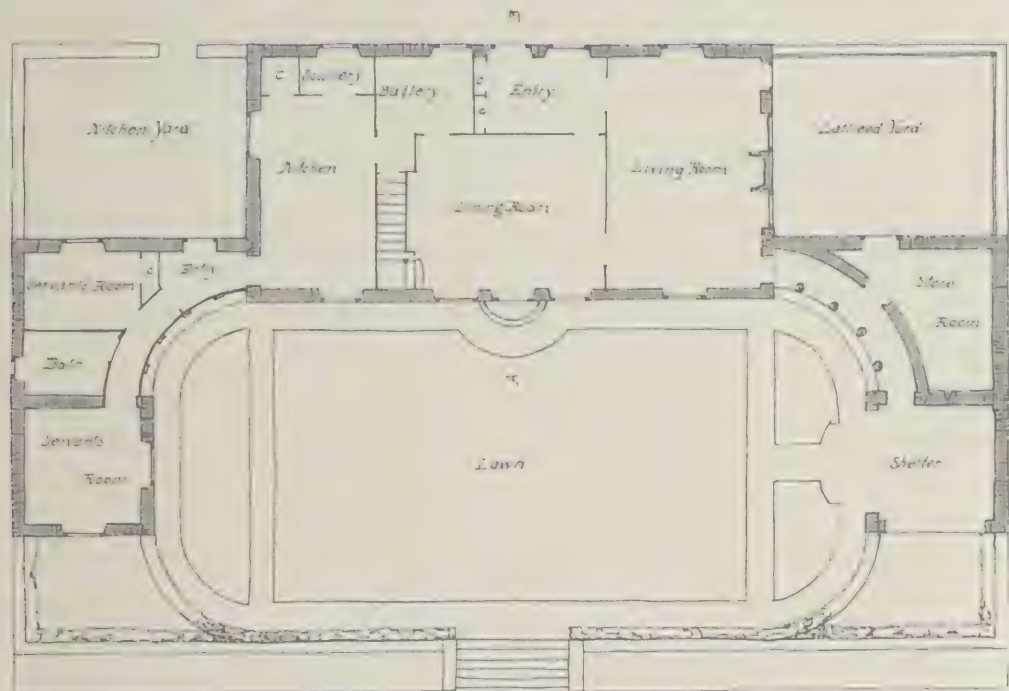


FIG. 1

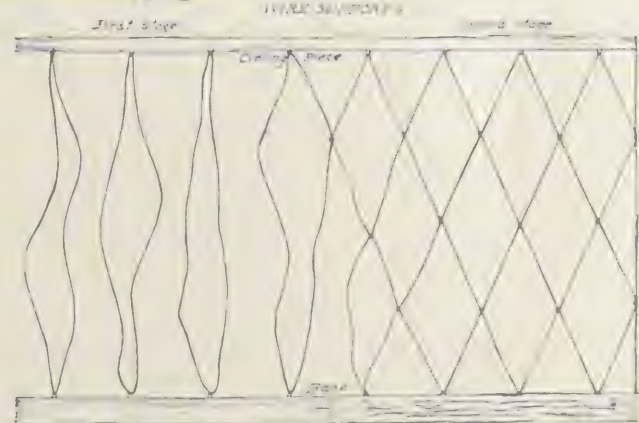
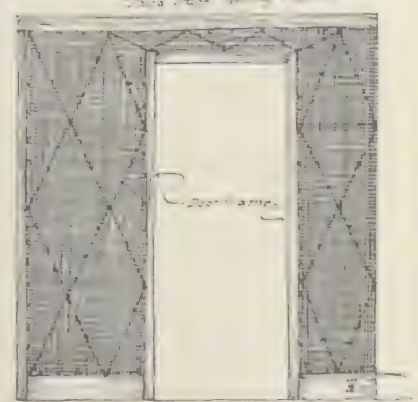


FIG. 2



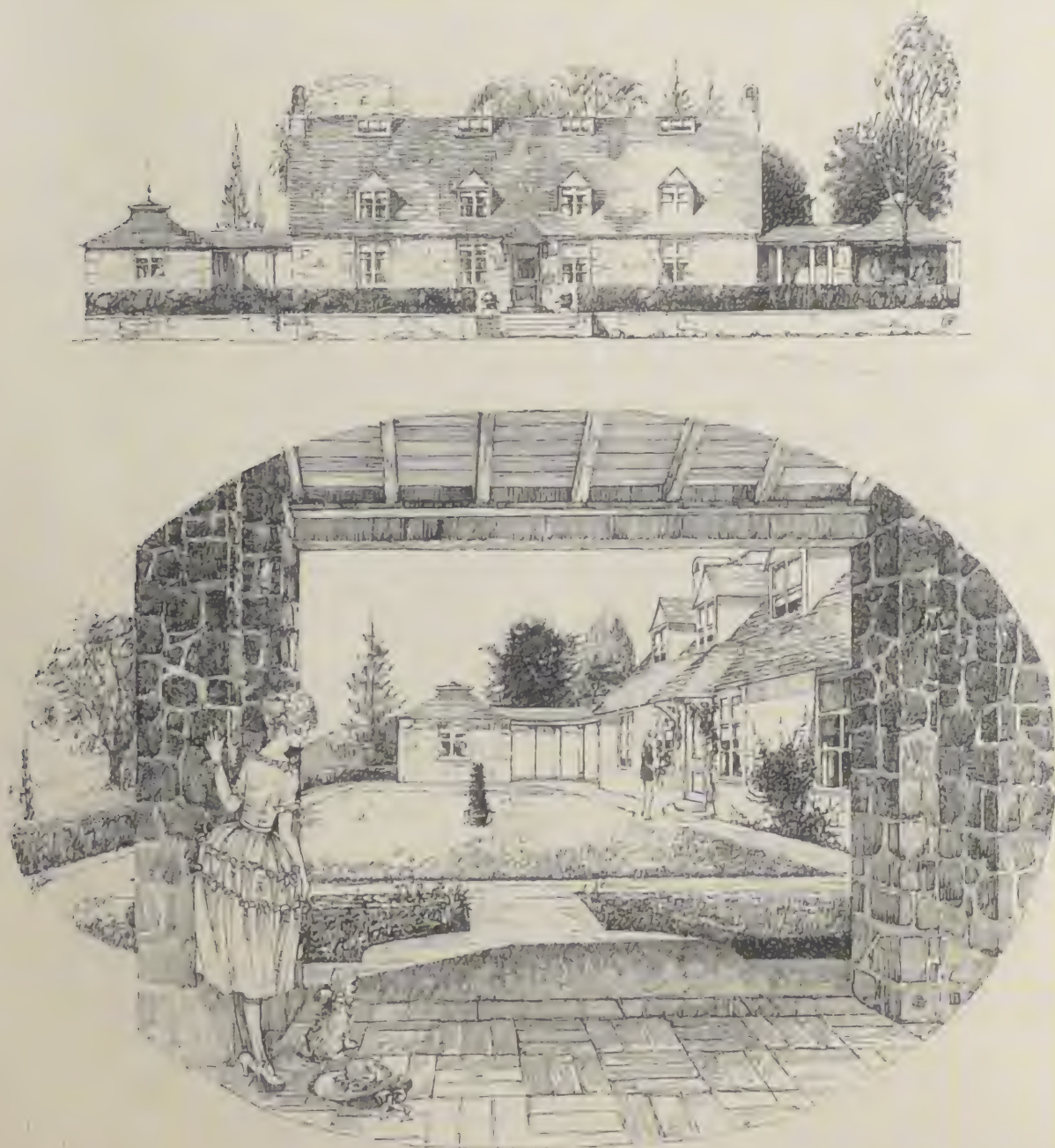
Section through Chimney

FIG. 3



Detail of window

Dec 10 1908
 Jan 11 1910
 Mar 21 1916



SMALL HOUSES

tric tubing and other small pipes, which it is often desirable to bury in the plaster. This new method is illustrated in Figures 1, 2, and 3 of Plate 9, and also by Photographs 17 and 18.

It will be seen that the wires are run loosely from floor to ceiling at short intervals; then the slack taken up by drawing them together by alternate seizings, producing a sort of diamond pattern as indicated in Figures 1 and 3. To the taut network thus formed, either wire lath or plaster-boards were fastened. This arrangement was found quite as satisfactory as the studs, more convenient because the wires do not interfere with small tubing and pipes, easier to erect, cheaper and more speedy. But the end was not yet; indeed, this was but the first step in the progress toward economy. The next was to substitute cords for the wires. Cord is cheaper and easier to handle, and as the wire is not necessary for strength, cord served well enough. It then seemed that, if there was no necessity for wire supports, there



No. 18
"Flagg partitions." Different stages in the work.

could be none for the wire lath, and that a jute scrim or plasterers' burlap would answer the purpose, which proved correct (see Photograph 19).

The idea was then conceived of dispensing with supports of all kinds, letting the jute support itself. This was the final step in the evolution. Such partitions are the most economical plaster partitions made; but any of the other methods, above described, are good, and comparatively economical.

In making partitions of this sort one should not allow bracing. The writer's experience is, that almost every mechanic who attempts to make a thin partition, of the kind described, will think bracing necessary, at least for the first coat, and if allowed to do so, will, in this way, squander a large part of the saving by a useless waste of time.

There are naturally some drawbacks to using these partitions. They are not thick enough to take heat ducts or the larger plumbing pipes, but it has been found in practice that these are difficulties which may be overcome by the use of a little forethought and ingenuity in planning.

Such partitions, properly constructed, serve well as bearing partitions. If built with wire mesh and Portland-cement mortar, they can be made of any desired strength and are more to be depended on than wooden-stud bearing partitions, which can burn. Wooden lath is, indeed, such a poor and dangerous building material, that it ought to be prohibited, now that there is nothing to be gained by its use.

Plate 9

Here is a house of a simple type, but to which considerable interest and importance are added by accessories. These consist of projecting wings, attached by quadrants, and a low terrace. The right wing contains a shelter which takes the place of the usual verandah, and in which the young person of the perspective is supposed to be standing. The opposite wing is occupied by the servants' quarters. The bedrooms for the family are all on the upper floor or roof story. On account of the width of the roof their ceilings do not extend up to the ridge as usual. In this case a flat ceiling is over a part of each room, at about 8' from the floor, having latticed openings into the space above, ventilated by ridge-dormers.

The staircase here, as in several others of these houses, ascends from the dining-room, an arrangement to which many will object for no better reason than because they are accustomed to another. A different one in this case would have resulted in loss of room, and the object now is to practise economy wherever it can be done without real loss of convenience or comfort.



No. 17
Erecting "Flagg partitions" in the Gwynne Building, Cincinnati, Ohio. Wires substituted for the studs of No. 16.



No. 19
"Flagg partition." Cord supports and jute net.

PLANS

THE scope of the programme which this work is intended to illustrate is in one sense very restricted, and in another boundless. It is boundless in that it places no limit on taste, while it is restricted because the houses are small, the requirements few, and the means of obtaining them scant. The designs are for homes of modest dimensions in which the accommodations furnished, in many cases, are practically identical, viz.: a living-room, dining-room, three or four masters' bedrooms, with two bathrooms, two servants' rooms, servants' bath, the kitchen with its dependencies, and sufficient storage space. These fulfil the needs of the ordinary American family in fairly comfortable circumstances. The programme is still further restricted by the peculiar methods used in construction and design, and most notably so by the use of the ridge-dormer. This feature, while greatly aiding the designer in obtaining pleasing proportions, supplying desirable quarters, and reducing cost, restricts his liberty in planning in ways which will immediately become apparent to one attempting to use it. He will find the roof a much more important factor than formerly. Gothic architects designed their buildings from the roof down, and one who uses the ridge-dormer must do pretty much the same thing. In order to use this feature with success ceiling slopes must be symmetrical: *i. e.*, the axis of the rooms should coincide with the ridge of the roof. When rooms occupy the full width of the *corps de bâtiment* in which they are placed, there is no difficulty about this; but when a corridor or passage is placed at one side, some expedient must be used to overcome the irregularity which it occasions. The one commonly employed, in these designs, is illustrated on Plate 37.

Thus restricted it might seem that variety in plan could not be great, yet these designs will, it is hoped, prove that there is little to fear on that score. If one person can, at a single stroke, so to speak, vary the designs to the extent here shown, what might not be expected from the architectural profession in general? It may be observed also that these designs represent many different types of plan, rather than variations of a few types. Moreover, in the design of small houses, a great variety of plan types is hardly needed. In Colonial times the types were few, while variety in design was abundant.

The collecting of plan types is an interesting pursuit; hints for many of those here given have been obtained from various sources and sometimes in most unexpected ways. One who is on the watch will often find plans in old buildings, which, as they stand, would be unsuited to modern wants but which embody an idea capable of use. No. 13 was obtained in that way. Though differing in many respects, it was suggested by the plan of a little French château called Grotteaux. Another, No. 24, was obtained from a description read many years ago of a Russian plan. No. 22 represents an adaptation of the typical French plan of the eighteenth century. The idea embodied in Nos. 12 and 32 is an adaptation of the Genoese custom of placing the most important rooms of the house at the top. Other plans were suggested by the external appearance of certain old buildings—among them, No. 23 by an old house which many years ago stood on Water Street, New Haven; No. 4, by one which before the war faced, and perhaps still faces, the public square at Coucy-le-Château, France; No. 42, by another old building on the public place at Bayeux, France, etc.

Several of the plans were due to the site itself; that is to say, they were evolved in the effort to fit the building to the topography, and of all ways of obtaining fresh and interesting plans this is the best both on artistic and practical grounds; Nos. 14 and 50 are of that kind. Topography had a great deal to do, too, with the plans for the little houses for the Richmond road, S. I., Plates 8 and 11. The same is true of the two houses of Plate 44, and the single ones on Plates 7, 16, 17, and 35; one plan, No. 43, is simply the result of accident, the arrangement being due to successive additions made from time to time to meet certain wants and fitted to the topography of the site. There are one or two which may be thought freak plans. They illustrate ideas, however, which by further study might be made to bear fruit. Nos. 32 and 39 are of that kind. Almost all the plans were influenced, more or less, by the topography of the intended sites and surrounding objects. Indeed, it is hard to see how any good plan can be free from such influences. Plans made in that way have the same relationship to those made without special reference to site that clothes made to order and fitted to the figure have to the ready-made product, or as hand-made to machine-made goods.

Houses having individuality and distinction cannot be turned out by any wholesale process, and it is for this reason doubtless that town planning, of which we have seen much recently, is usually so disappointing even when the work of able architects. No. 10 came from a most unexpected source. Mr. Anthony Trollope is responsible for it; or, at least, for preserving from oblivion the work of some long-forgotten architect which here again bears fruit. In "Barchester Towers" Mr. Trollope gives a fascinating description of an old English house which he calls "Ullathorne Court"; and with such perspicuity that the writer had simply to draw the plan as described; but in doing so, some modifications were made which, doubtless, would have shocked greatly the delightful old people with whom Mr. Trollope has peopled "Ullathorne Court." He thus describes it:

"Mr. Thorne's house was called Ullathorne Court, and was properly so called, for the house itself formed two sides of a quadrangle, which was completed on the other two sides by a wall about 20' high. . . . Entrance into the court was had through a pair of iron gates, so massive that no one could comfortably open or close them, consequently they were rarely disturbed. From the gateway two paths led obliquely across the court; that to the left reaching the hall door, which was in the corner made by the angle of the house, and that to the right leading to the back entrance, which was at the further end of the longer portion of the building.

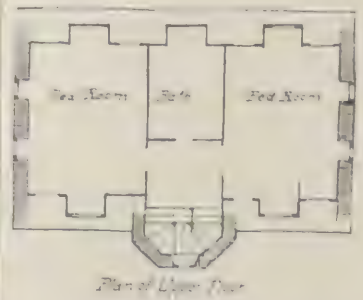
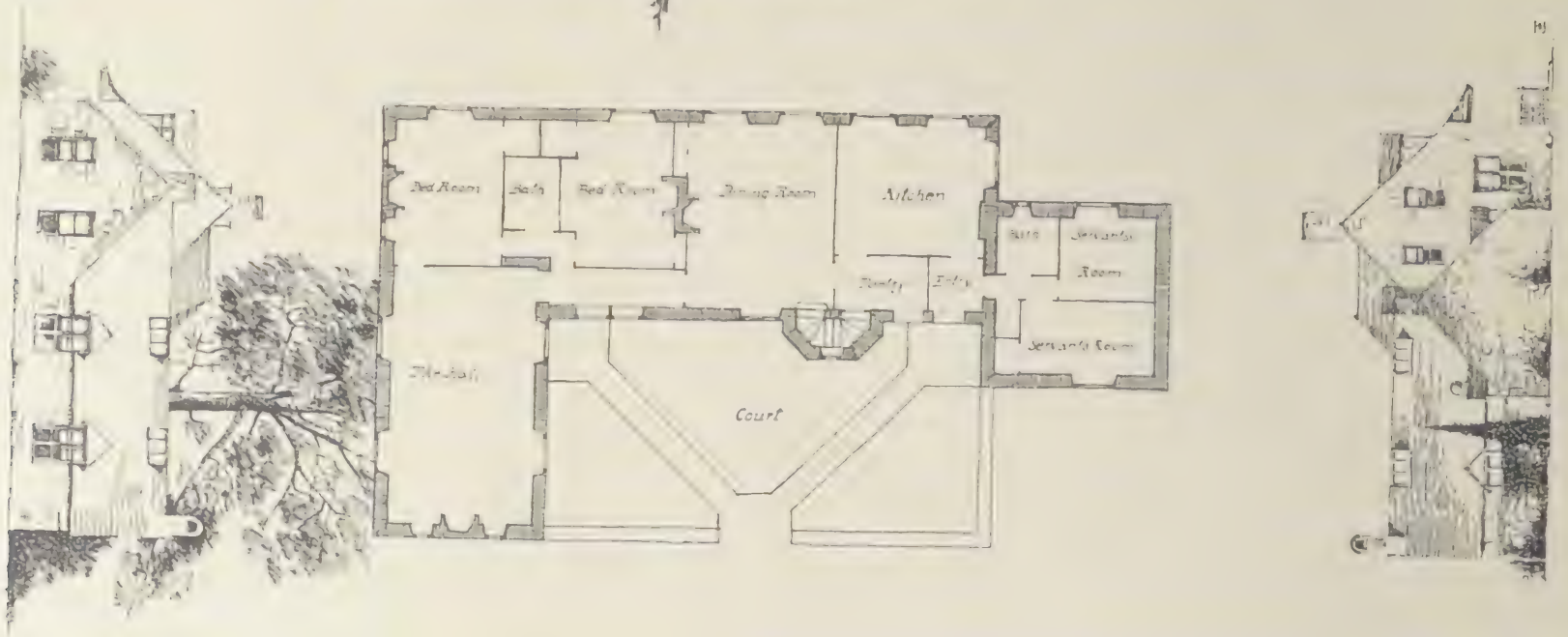
"With those who are now adepts in contriving house accommodation it will militate much against Ullathorne Court that no carriage could be brought to the hall-door. If you enter Ullathorne at all, you must do so, fair reader, on foot, or at least in a bath-chair. No vehicle drawn by horses ever comes within that iron gate. But this is nothing to the next horror that will encounter you. On entering the front door, which you do by no very grand portal, you find yourself immediately in the dining-room! What,—no hall? exclaims my luxurious friend, accustomed to all the comfortable appurtenances of modern life. Yes, kind sir; a noble hall, if you will but observe it; a true old English hall of excellent dimen-

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 10

Table of Modules

1 m	=	3'-9"
2 "	=	7'-6"
3 "	=	11'-3"
4 "	=	15'-0"
5 "	=	18'-9"
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7 "	=	26'-3"
8 "	=	30'-0"
9 "	=	33'-9"
10 "	=	37'-6"
11 "	=	41'-3"
12 "	=	45'-0"
13 "	=	48'-9"
14 "	=	52'-6"
15 "	=	56'-3"



SMALL HOUSES

sions for a country gentleman's family; but, if you please, no dining-parlour.

"... A huge screen partitioned off the front door and a portion of the hall, and from the angle so screened off a second door led into a passage, which ran along the larger side of the house next to the courtyard. Either my reader or I must be a bad hand at topography, if it be not clear that the great hall forms the ground-floor of the smaller portion of the mansion, that which was to your left as you entered the iron gate, and that it occupies the whole of this wing of the building. . . .

"Mr. Thorne had, indeed, once suggested that with very little contrivance the front door might have been altered as to open at least into the passage; but on hearing this, his sister Monica—such was Miss Thorne's name—had been taken ill, and remained so for a week. Before she came downstairs she received a pledge from her brother that the entrance should never be changed in her lifetime.

"At the end of the hall, opposite the fireplace, a door led in to the drawing-room, which was of equal size, and lighted with precisely similar windows. But yet the aspect of the room was very different. It was papered, and the ceiling, which in the hall showed the old rafters, was whitened and finished with a modern cornice. Miss Thorne's drawing-room, or, as she always called it, withdrawing-room, was a beautiful apartment. The windows opened onto the full extent of the lovely, trim garden; immediately before the windows were plots of flowers in stiff, stately, stubborn little beds, each bed surrounded by a stone coping of its own; beyond, there was a low parapet wall, on which stood urns and images, fauns,

nymphs, satyrs, and a whole tribe of Pan's followers, and then again beyond that, a beautiful lawn sloped away to a sunk fence which divided the garden from the park. Mr. Thorne's study was at the end of the drawing-room, and beyond that were the kitchen and the offices. Doors opened into both Miss Thorne's withdrawing-room and Mr. Thorne's sanctum from the passage above alluded to; which, as it came to the latter room, widened itself so as to make space for the huge black oak stairs, which led to the upper regions."

From the foregoing it will be seen that in the design herewith submitted several liberties have been taken with the plan of "Ullathorne Court" as described by Mr. Trollope. Miss Monica's "withdrawing-room" has been cut up and converted into two bedrooms having a bathroom between them; and the hall has ceased to be used for dining purposes; also Mr. Thorne's sanctum has been converted into a dining-room, and the partition which separated it from the passage removed; by which latter alterations the stairs to the upper regions are brought into the dining-room. And why is not this arrangement of stairs a very proper one? Just as sensible, at any rate, as eating in the hall—a custom of which the Thornes were so tenacious. What harm if the stairs do start from the dining-room, if space and money can be saved thereby, where it is important to save space and money? Why spoil little houses by forcing into them all the divisions which may be appropriate and desirable in larger ones? When floor space is limited, the most should be made of what there is, and that can often best be done by omitting partitions which are not really necessary, and thus gain better, even if there are fewer, rooms.

DESIGN

ONE of the best ways to economize in building is to economize on ugliness. A good-looking house will rent better, sell better, be pleasanter to live in, and altogether worth more than if ugly.

Nothing can be of greater service in avoiding ugliness than a knowledge of the principles of design. Acquaintance with even a few of them will aid powerfully in that respect. If the chief rules of good design were understood by the masses as they might be, nothing would do more to promote beauty, improve workmanship, add to the value of manufactures, and in many other ways further the general welfare and prosperity of the country. They are simple, easy to acquire, and should be taught with the alphabet.

When one understands the principles of design, his taste will have something more solid as a basis than mere whim or fancy, which in the untutored is more likely to be bad than good. He will know what is right and why it is right. Acquainted with the rules of good design, he will not accept articles made in defiance of them. Therefore, if this knowledge were general, all products dependent on design would be elevated and improved in quality, and find readier and wider markets.

The neglect of this study in the United States is astonishing. How few people, even among the supposedly well educated, can give an intelligent explanation of the qualities of a design!

Most of the qualities of good design may be broadly classed under two heads, viz., essential and desirable—the desirable ones being those which reflect the character and personality of the artist, and the essential ones those which are necessary in order that the design may be worthy to be classed at all as a work of art.

Among the essential qualities are reason, unity, harmony, clarity, and variety.

Among the desirable qualities are imagination, interest, refinement, simplicity, dignity, and style.

A design may be good which conforms to requirements of the kind mentioned in the first list, but cannot be great unless endowed with other qualities partaking of a personal nature, as illustrated by the second list.

In this essay only the briefest explanation of the meaning here attached to the above terms is attempted, but in the following ones some are more fully considered.

In the human figure as it approaches perfection—nature's supreme production—is contained the sure guide for the determination of all true principles of design. In it may be found the exemplification of all of the above-mentioned qualities except imagination, which is spiritual, and many more besides. So in stating the rules of art one has simply to record what is there revealed. The study of the best specimens of the human form is, therefore, of the utmost importance in the refinement of taste, and it was because the ancient Greeks, more than any other people, realized this truth that they excelled all others in art.

But to return to our lists; the qualities above classed as among the essentials of good design are:

First. Reason, i. e., the logical appreciation of the fitness of things. Reason is the highest gift with which we are endowed, and to suppose any production, worthy to be called a work of art, can

be made without its use is foolish. What then shall be said of those designs which are in evident conflict with the dictates of reason! It is unthinkable that any such can long endure and be generally admired. The test of design in the light of reason may be made by any one possessed of ordinary common sense who will set himself to it, and how many things which pass with the unthinking as good art will fall at that test and excite amusement rather than admiration. By the use of reason many mistakes in design may be avoided and many counterfeits of art readily detected. But it is by no means here meant that the cold test of utilitarianism be applied to all design, or that there should be no such thing as artistic license. Beauty alone is an excellent reason for many things, but when a design is in direct conflict with common sense it cannot be a work of art. Reason requires all things to have a use and be appropriate and fitted to the purpose for which they are used. The human form in its every detail is the perfect exemplification of this principle.

Second. Unity. Any design worthy to be called good must have unity, both intellectual and corporeal; that is, unity of purpose and unity of mass, and this quality must appear both in the whole and in every subordinate part. Unity of purpose is shown by continuity, or the proper relationship of the parts with each other, and with the whole as one sees it best expressed in the human form. Unity of mass is obtained by giving predominance of mass to some one feature, and thereby making the others subordinate to it. The trunk of the body gives unity to the whole figure, the palm gives unity to the hand, and so it is in all good design—the whole and every dependent part has unity of mass.

Third. Harmony. Harmony is essential in design as it is in music; it is all-embracing and should reign throughout—harmony in purpose, harmony in dimensions, harmony in form and harmony in color. In good design discord can have no place. Harmony of dimensions is proportion. In good design there is an agreeable and fitting relationship between all dimensions. In like manner harmony must exist in all other matters, whether of form, color, purpose, or other element entering into the design, so that all may unite to form a complete, harmonious, and well-rounded composition; of which the human figure affords the best example.

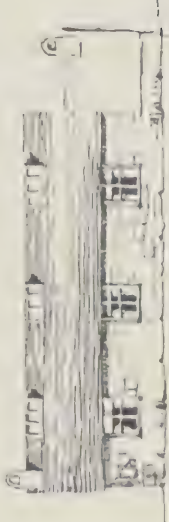
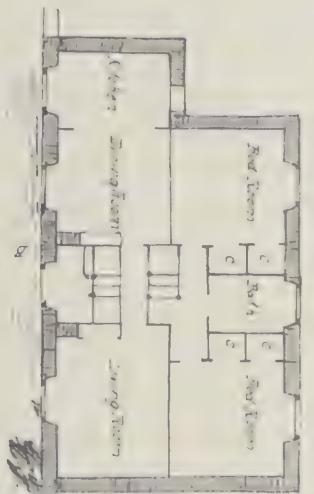
Fourth. Clarity or Decision. The lack of this quality is destructive of good design, for without it there is uncertainty, hesitation, obscurity, instability, or other qualities incompatible with good art. The meaning and object of the design should be clear. In other words, it should be frank, as the French say. The observance of this principle will insure the avoidance of many defects of a disturbing nature which are inconsistent with good design, and not to be found in the human figure as nature intended it to be.

Fifth. Variety. The requirements of unity and proportion both tend to produce variety in dimensions, but more is requisite. Movement, contrast, and accent all contribute to variety. Variety is said to be the spice of life, and the adage is equally applicable to design. Monotony and dryness are lurking enemies which may be vanquished by variety. Here again one cannot do better than study nature's method of securing variety in the human form, where in the best specimens one may find it in shape, quality, and line, combined in fullest measure with all the other elements of good design.

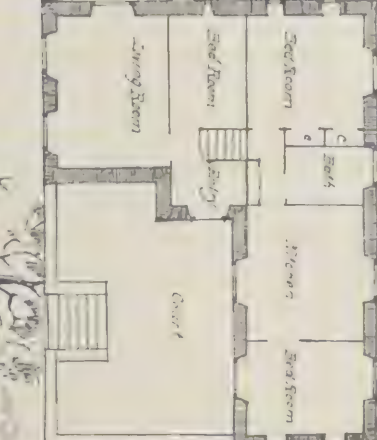
Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
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8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"

House A



House B



House C



SMALL HOUSES

Qualities of the foregoing kind, when applicable, are essential to good design, and their significance should be understood by all. The qualities called personal are, in general, of a more subtle kind; their application in large measure is more dependent upon feeling and temperament, and the ability to impart them, in greater or less degree, is the gage of genius in art. Those above mentioned were:

First. Imagination. The term imagination in design implies originality. It results in a reflection, in the composition, of the working of the mind of the designer. It is a quality purely personal and the invariable accompaniment of great art. Imagination may be called the dynamic force in art. It is in a sense the measure of man's superiority over nature. Nature can produce; man can spiritualize. It is the quality which distinguishes the artistic from the photographic representation of nature.

Second. Interest. This term, as here used, is one of degree. A design which is reasonable and possessed of unity, harmony, and variety has, of course, some interest; but a design to be great must have great interest, and the ability to impart great interest depends largely upon the personal qualities of the designer. The example of Greek art shows that the most potent of all ways to impart interest is to endow the design with beauty of form, and that of all kinds of beauty the one which makes the strongest appeal to human interest and admiration is physical beauty in human shape. Therefore, one who is able to use this agent enlists in his favor the most powerful element there is in design.

Third. Refinement. While the possession of this quality is due, in the first instance, to education, it is also largely a matter of temperament. The better the steel, the keener the edge that can be given to it; so also some natures are capable of a higher degree of refinement than others. Education or environment may produce refinement, but the quality of that refinement is largely dependent on the nature of the recipient.

Fourth and Fifth. Simplicity and Dignity are so nearly related that they may be considered together. It is hard to see how a design can have great dignity without simplicity. A quiet air of reserved power is characteristic of dignity, and that is best obtained by simple means and the absence of apparent effort. Simplicity is the mark of genius. The giant in art does his work easily, without straining and without affectation; his ways are direct and to the point. A master in art need not go into the highways

and byways for effects; he knows the straight course and follows it.

With dignity and simplicity come repose. Repose of manner is the mark of good breeding; so, also, repose in design is the mark of high training. It is the natural state of one at home in his surroundings and sure of his ground. Repose is a distinguished characteristic of Greek art.

Sixth. Style. This is the very hall-mark of great art—a quality too subtle for analysis; more than any other of those mentioned, this one depends on temperament. Many useful hints may be given toward the acquirement of style, but if one has not the capacity for it, he cannot make use of them. The vulgar term "snap" is very expressive of style in design. There is style in the curves of an angry beast's tail, in the lines of an athlete at practice, and in the profiles of Greek mouldings. But there is little use in trying to define style. If one has it in his nature he may produce it—otherwise not.

Plate II

The three little houses illustrated on this plate are part of a row of several intended for the Richmond Road, Staten Island. The hill rises abruptly from the road, and in order to get room enough for the houses it is necessary to place them on a retaining wall. Moreover, to better accommodate them to the land, the floor in the rear section of each is raised one module higher than in front. These houses generally have but a single story, and the ceilings of the rooms follow the slopes of the roof up to the ridge-dormers, with which they are provided.

Because it was thought desirable to show the relationship of the houses to each other in the row, it was not possible to place every elevation and section opposite the side of the plan to which it belongs, as on most of the other plates, but the drawings will readily explain themselves. Each house has five rooms and a bath; they are intended for occupancy by well-to-do mechanics. Although the accommodations are practically the same, there is still considerable difference in the arrangement of the plans. Notwithstanding the steps required on account of the differences in floor levels, very little space is given to means of communication. The land is too steep to permit of gardens back of the houses, but there are small patches for vegetables or flowers between them.

WINDOWS

HOLDING fast to our inherited English building traditions, we use double-hung windows. "Guillotine windows," the French call them. The sash slide up and down, overlapping at the meeting rails. In many respects this is a poor kind of window. Only half of it can be opened at a time; the sash must be counterbalanced by weights and pulleys, and the weights enclosed in boxes, for which it is often hard to find a place; it is difficult to wash, as one must stand or sit outside on the sill to do so; it has more mechanism than the casement window and requires more wood and hardware in its manufacture; it cannot be properly screened, because in order to wash it the screen must be removed. Moreover, it is ugly, being cut in the middle by the overlapping meeting rails with glass in different planes.

Casement windows hinged to swing in are free from these defects, but are not popular here because we do not take the trouble to learn how to build and operate them properly. In this country casement windows are supposed to have certain ineradicable defects, the chief of which is that they almost invariably leak; but this is because we do not make them right. The vain attempt is made to exclude water entirely, which, under ordinary circumstances, cannot be done. Some water must enter, and the secret of making casement windows tight is to accept that condition and contrive to catch this water and conduct it out, through properly constructed drains, before it gets by the sash. When this principle is once recognized there is no trouble in making them perfectly weather-tight. Windows built strictly in accordance with the detail on Plate 12 will not leak.

Figure 1 represents a plan or horizontal section through the frame and sash showing one of the jambs and the meeting rails. It will be seen that any water driven in at the place where the sash meets the jamb would encounter a vertical drain which leads down to the drain in the sill, shown on Figure 2, from which drain-holes conduct it outside under the sill. There should be at least three such holes—one at the center and one at each end of the sill. The drain in the sill should be larger than the one in the jamb; $\frac{1}{2}$ " will do in one case and $\frac{3}{4}$ " in the other. The drain-holes must not be large enough to admit wind nor small enough to clog readily. Where the sashes meet there is another drain, similar to that of the jamb, and this too connects with the drain of the sill. These windows are very convenient to wash, for they swing into the room, and all parts can easily be reached without the danger and inconvenience attendant upon the cleaning of double-hung windows. In places which are hot in summer it is important that the whole window open, not simply half of it. What would be thought of a casement window of which half could not be opened? One objection which most people here have to casement windows is that they interfere with shades; but this is because they do not understand that the shades should be outside, not inside the room. In these houses the shades are made of awning material placed on a roller, protected from the weather, and operated from inside the room by a cord which passes through a hole in the window-frame. The shade is weighted at its lower end by a metal rod having small rings, one at each end, which slide on wire guides at the sides and keep it from flapping. No springs are needed in the roller. The arrangement is simple and effective. The writer has used such shades on his own house for

the last ten years, during which time they have worked perfectly and required no repairs. Photograph 20 shows one of them, and Figures 2 and 3 explain the method of installation. The apparatus is extremely simple and easy to make. Although such shades are not found in this country, there being no demand for them at present, almost any mechanic can make one, and all the parts may easily be had, because similar ones are used for other purposes. In Figure 2 is a section of the head of the frame showing the hole through which the cord runs to operate the roller. At each end of the hole there is a little brass plate smoothed and rounded at the edge, so as not to fray the cord which runs on a spool at the end of the roller, having flanges to keep it in place. Figure 3 is a sketch of one corner of the frame from the outside, with the hood omitted. It shows the spool with its flanges on which the cord runs, an end of the weighted rod to which the lower edge of the shade is attached, and one of the wire guides. When the window-frame is made a little deeper, as indicated in Figure 5, there is room enough for the shade under the lintel between sash and fly-screen, which is neater and makes the hood unnecessary.

Another objection to casement windows, and the only one which seems legitimate, is that they cannot be opened a little, top or bottom, for ventilation, like double-hung windows—a difficulty which may be overcome by the use of transoms, a ventilator in the lower rail of the sash (in which case this rail must be made deeper than usual), or by a hook and eye on the meeting rails, so that the sashes may be held slightly ajar.

When windows are tall, they are operated by *crémone* bolts, or by *espagnolettes*, which are rather expensive; but for small sashes of the kind used in these designs, nothing more is required than bolts and little turn buckles—one near the top and one near the bottom.

When casements are used, the whole window opening can be protected by a fly-screen. In these houses the wire mesh is fastened directly to the window-frames, and the cost of making special frames saved. The wire mesh is of copper so fine as to be hardly visible; there is therefore no reason for ever removing it. This saves a good deal of trouble and expense in maintenance.

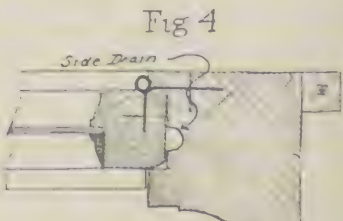
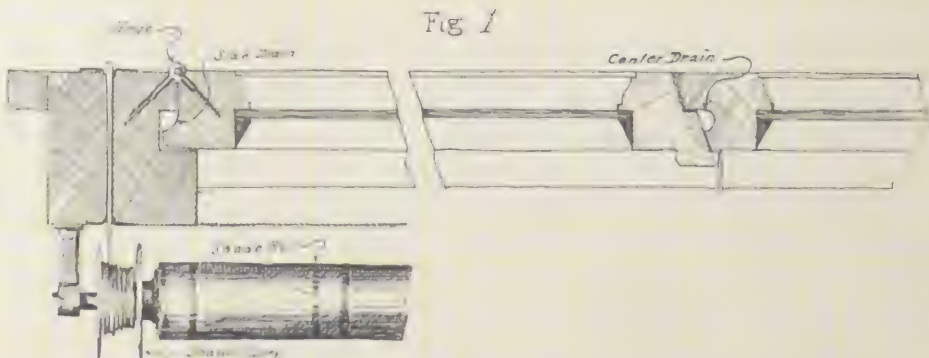
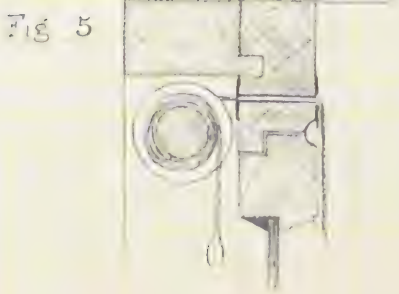
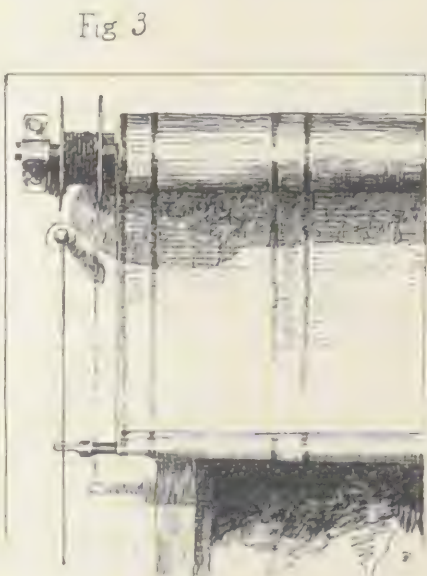
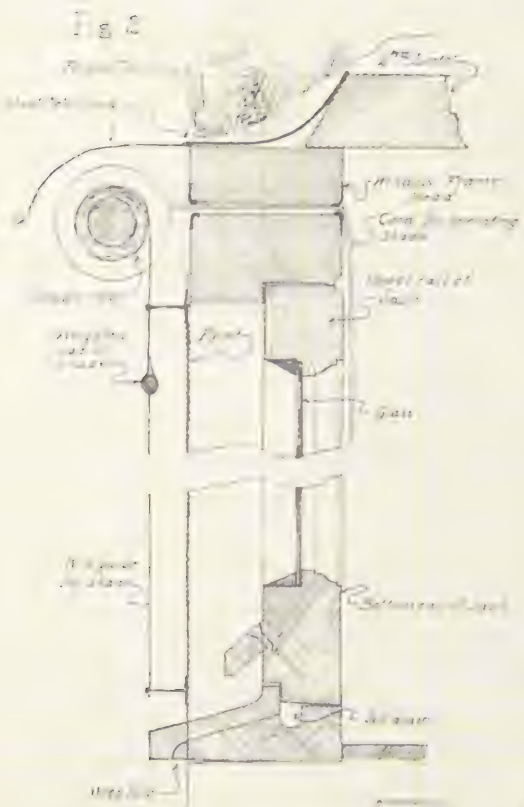
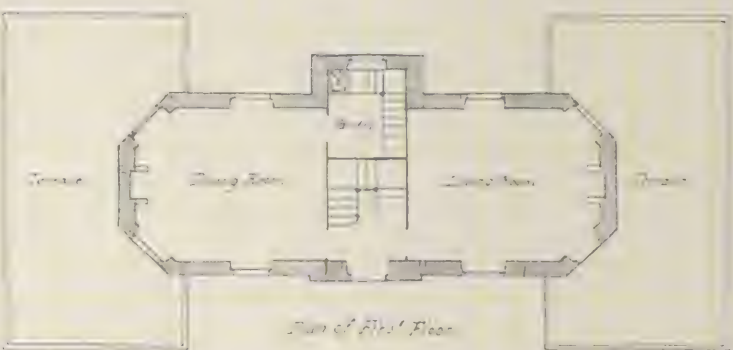
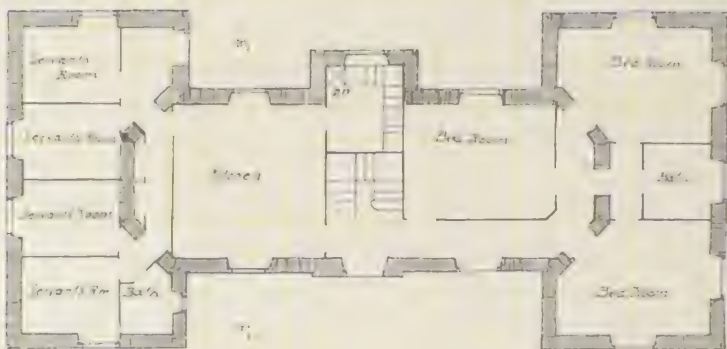
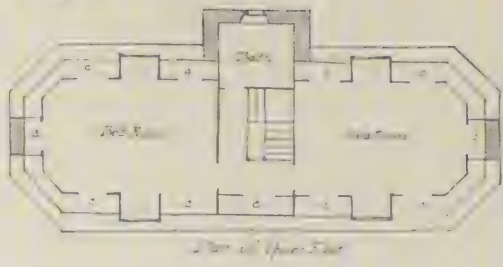
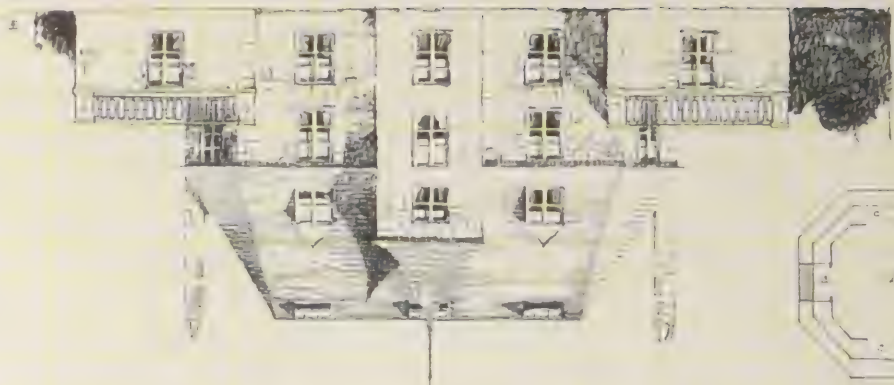
In these houses the window-frames are set flush with the outer face of the wall; thus the cost of stone sills and reveals is altogether avoided. As the frame is stood in the form, before the stone and concrete are put in, and becomes engaged in those materials as the wall is built, it is necessary that it be placed exactly in its proper position and perfectly plumb. It must lie flat against the planks of the forms and can have no projecting member, such as the lip of the sill. This piece is therefore made separately and applied afterward.

Plate 12

This design represents a very considerable departure from ordinary methods of house-planning. The arrangement was suggested by the Genoese custom of placing the principal rooms on the upper floor. In many of the palaces of Genoa the state apartments are at the top, while the bed-rooms and other pieces of less importance occupy the lower stories. In the present design three of the bed-rooms are on the ground floor, and the living-room and dining-room occupy the whole of the first floor. The end windows of both rooms

Table of Modules

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12	-	45'-0"	
13	-	48'-9"	
14	-	52'-6"	
15	-	56'-3"	



SMALL HOUSES

open down and give access to terraces formed by the roofs of the lower story. This is a somewhat revolutionary suggestion in house-planning, but is it unreasonable? Why not place the rooms which are most important and most used in the best part of the house? During half the year these little terraces would doubtless prove the most valued parts of the building, for they would constitute delightful adjuncts to the living-rooms. The habit which some Eastern peoples have of using the roofs of their houses for living purposes is certainly worthy of respectful consideration. What could be more

pleasant, for instance, in summer than to dine and pass the evening on these terraces? Places of this kind, elevated somewhat above ground, are more agreeable than if at the ground level. They command a wider view and possess a certain suggestion of privacy which is lacking at the ground level. The terraces should, of course, be protected in whole or part by movable awnings. Two more bedrooms and a bath occupy the upper floor. This house is, therefore, somewhat larger than usual in these designs, and has a more liberal supply of servants' rooms.



No 20

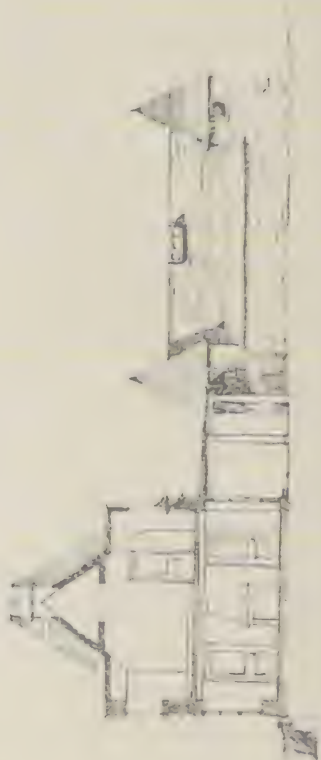
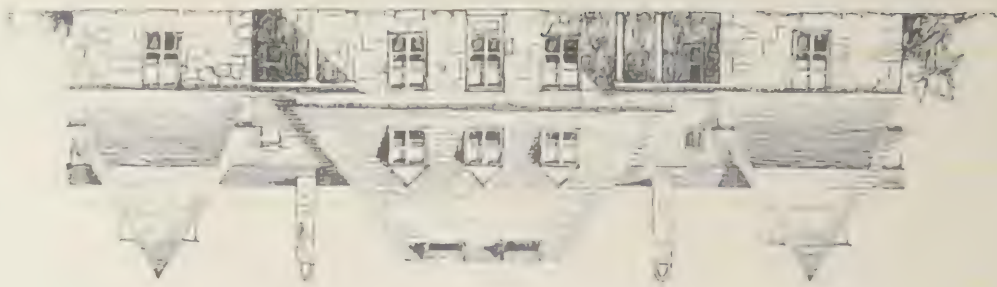
Outside shade. When the photograph was taken this shade had been in use ten years without repairs. Operated from inside by a cord winding between flanges at the left of roller.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 13

Table of Modules

1	-	3'-9"
2	-	7'-0"
3	-	11'-3"
4	-	15'
5	-	18'-9"
6	-	22'-0"
7	-	26'-3"
8	-	30'
9	-	33'-9"
10	-	37'-6"
11	-	41'-3"
12	-	45'
13	-	48'-9"
14	-	52'-6"
15	-	56'-3"



XIII

TOPOGRAPHY

IN planning a house, much should depend upon surrounding objects and the topography of the land. The house should be adapted to the site, and it often happens that sites which at first appear very unfavorable may, with the use of a little ingenuity in planning, seem as if made for the purpose. Harm is often done and money wasted by attempting to force a preconceived plan on an unsuitable site. One should approach the site with an open mind, and try to receive suggestions from it as to the planning of the house. Some of the best plans for irregular sites are those which are made on the spot, after the fashion of many mediæval buildings, which seem to grow out of the soil and belong to the landscape. It often happens, therefore, when one approaches the problem in the proper way, that the very difficulties of site prove blessings in disguise and lead to happy arrangements of plan which otherwise one would never have thought of. Sometimes much money is spent in grading upon a site which would have been better without it if the builder had only adapted his building to the lay of the land. In rolling or hill country much of the cost of excavation may sometimes be saved by taking advantage of natural depressions or slopes for sub-stories. The odd floor levels and irregularities of plan found in many old houses of Europe, and which come about naturally by the accident of site, are often effective and interesting; but it is a mistake to go out of one's way to produce such results. When there is an obvious straining after the bizarre and picturesque, the effect is sure to be bad; just as all other forms of affectation are bad and repugnant to good taste.

Sometimes one sees houses where different levels have been fixed for rooms on the same floor for no apparent reason, and where they serve no other purpose than to make stumbling-places and points of danger for those who come upon them unawares. One who resorts to such expedients for his effects must, indeed, have a limited range of ideas and little common sense. But there are cases where much may be gained by the adoption of different levels for floors of different rooms of the same story; as, for instance, where a house stands on a sloping bank or hillside, where excavation and foundations may be saved, or where, by adopting different levels, corridors may be shortened or dispensed with altogether. Such expedients have been used in several of these designs (see Photograph 21). When cellars are omitted, altogether or under a large part of the house, as they are here, there is a much stronger inducement to keep the floors close to the ground than otherwise, because by so doing masonry and fill are saved.

Mediæval builders were given to placing rooms and wings at all sorts of angles with respect to each other where anything could be gained thereby. The success of such arrangements must, however, depend largely on the necessity for them. In those troublous times, builders were often driven to make use of very difficult, irregular, and sometimes almost inaccessible sites by the exigencies of defense; they thus acquired habits of planning on the spot to fit the land, so that it is often hard to think that any drawings were made except on the soil itself, and this is a most excellent thing to do whenever the occasion requires; but to deliberately plan irregularities for the sake of appearing picturesque is a ridiculous proceeding.

If people who have a craving for the picturesque, romantic, and interesting in building would, instead of copying the work of mediæval builders, set themselves to learn the motives which actu-

ated those builders and apply the principles used by them, they would doubtless succeed in producing the real thing instead of imitations.

In what has been said it is not to be supposed that any sacrifice of the proper arrangement or convenience of the plan to the site is advocated, but rather the exercise of care, study, ingenuity, and contrivance to overcome or make use of the difficulties which the site presents, or to co-operate with the land, so to speak, in making the plan. If, when working on this principle, nothing new, nothing interesting, nothing out of the ordinary presents itself, then the planner must, indeed, have mistaken his vocation.

Plate 13

This design was suggested by the charming little château of Grotteaux. It is hardly more than a row of rooms, yet makes an



No. 21

House fitted to the slope of the land.

interesting and livable house. It consists of a central body and two end pavilions. The connecting-links contain the entrances, of which there are two.

On the ground floor the living-room and dining-room occupy the center of the house; in the left pavilion is one bed-room with a bath-room, while the right pavilion contains the kitchen. The left staircase gives access to two masters' bed-rooms and a bath, and the right one, from the kitchen, leads to the servants' quarters and nursery. The house is intended to have no cellar, the two storage buildings being supplied, at less cost, in lieu of it.

In spite of its simplicity this is an unusual plan. The house has about it an air of distinction in keeping with its French origin.

It is not contended that this type of plan is the most economical; a more compact one would, of course, be more so, but there is little waste space. In these houses all unnecessary features are eliminated and the work greatly simplified and cheapened, but beauty is not considered unnecessary, and beauty cannot always be had without some sacrifice. The designs represent many different types of plan, and of course all cannot be the most economical. It is simply a question, in this case, of whether one is willing to sacrifice something in obtaining an interesting and picturesque result.

XIV

BEAUTY

ONE object of this work is to promote beauty by pointing out how better-looking and more desirable houses than the ordinary may be had without increased cost.

Beauty is like a plant beset with parasites, which must be combated to preserve it. The most common of these pests are sordid commercialism, expediency, short-sightedness, ignorance, neglect, and poverty. The best and perhaps the only way to attack them, with any hope of success, is by the propagation of intelligence.

The example of ancient Greece shows that under certain conditions a whole people may be given over to the pursuit of beauty, and that under such conditions art attains its highest development.

Although more than two thousand years have passed since Greek art reached its apogee, and though time, vandalism, and accident have destroyed all but a comparatively few scattered fragments of it, yet those, broken and disfigured as they are, still excel in beauty all subsequent productions, and stand unrivalled as the world's supreme examples of art.

The art of ancient Greece differs from subsequent art in that its primary object was the pursuit of pure beauty of form; whereas in subsequent art, speaking generally, this aim has been secondary.

In Greece, art and beauty were synonymous terms; but since then they have borne very much the same relationship to each other as religion and morality. The two are supposed to go together, but do not always do so.

The predominant rôle which beauty should have in art has been overlooked. Character, expression, and color have interested the artists to the neglect of beauty pure and simple; they seem not to have understood that those qualities, however desirable, do not constitute the whole field of art.

"These ought ye to have done, and not to leave the other undone."

The partial and sometimes complete abandonment of what was the chief characteristic of Greek art seems to have been largely due to the introduction of the Christian religion with its changed standards of morality, for the good in the ancient civilization was confounded with the bad, and destruction fell on both alike.

Greek art demonstrates that the search for pure beauty of form, as chiefly exemplified in the human figure, exercises a most potent influence on all branches of design, affecting the character and appearance of all kinds of handicraft, and most of all the chief one, architecture.

Since the time of the Greeks many notable structures have been erected by man, some of great beauty; also superb works of statuary and painting; but where, among them, does one find a Parthenon, or sculpture of the kind which adorned it? All these latter works, with few exceptions, belong to a lower type of art, in that they do not possess the Greek perception of beauty of form.

The supreme importance of this quality in art may be realized by comparing Greek art with other art. For instance, Rodin's "Thinker" is deeply expressive of sentiment, but without physical beauty of form; while "The Torso" of the Vatican has scarcely any other attribute than beauty of form. Broken and disfigured, without head or limbs, it still possesses a remnant of the physical beauty with which the statue was originally endowed. While there may be a question as to which of these two works as they now stand

makes the stronger appeal to human interest and admiration, the mere fact that there can be any question about it shows the compelling force which physical beauty exercises on the imagination. How heavy a handicap, therefore, has the great Frenchman placed on himself in choosing for a model one that makes it necessary to leave out of his work altogether the only quality upon which "The Torso" depends for its charm. Or, suppose the statue complete, of which "The Torso" is but the shadow, and possessed of sentiment in equal measure to that of Rodin's "Thinker," how great an advantage would the Greek sculptor have had.

Leonardo's "Last Supper," as it was, replete with color, high dramatic interest, expression of character, emotion, and strong religious association, when compared to the frieze of the Parthenon, possessed of none of these qualities, sinks to second rank, in the estimation of many, as a work of art. But whatever may be thought of the relative merits of these two great productions, is it not evident that the frieze depends almost entirely for its effect upon a quality which the other has in small measure?

From which it appears that one who seeks to portray any form of intellectual beauty would be doubly successful in his appeal to human nature if he would combine with it physical beauty also. To neglect that is to discard trumps, so to speak, in the game of art. It is not surprising, therefore, that the Greeks—the only people who fully realized this truth—should have surpassed all others in art.

Who has not admired that stirring French war-poster known as "*On les aura*"? It would be interesting to know how much of the appeal which it makes to human interest depends on action and sentiment and how much is due to the personality of the subject. If the youth which it portrays had been ill favored, would not the artist have placed himself under a heavy handicap? Why then should not the great power which physical beauty has on human nature be made more use of in art than it is?

The instinct for beauty, and especially physical beauty of the human form, is so deep-seated in our nature that no other quality, even though of a higher intellectual type, can supplant it in interest and admiration. One who employs it, therefore, enlists in his favor the most potent force there is in design and enters the lists doubly armed. By its use the Greeks vanquished all mankind in art, and more than two thousand years of subsequent effort have only served to demonstrate the correctness of their position and prove that no other quality can fully compensate for the lack of this one.

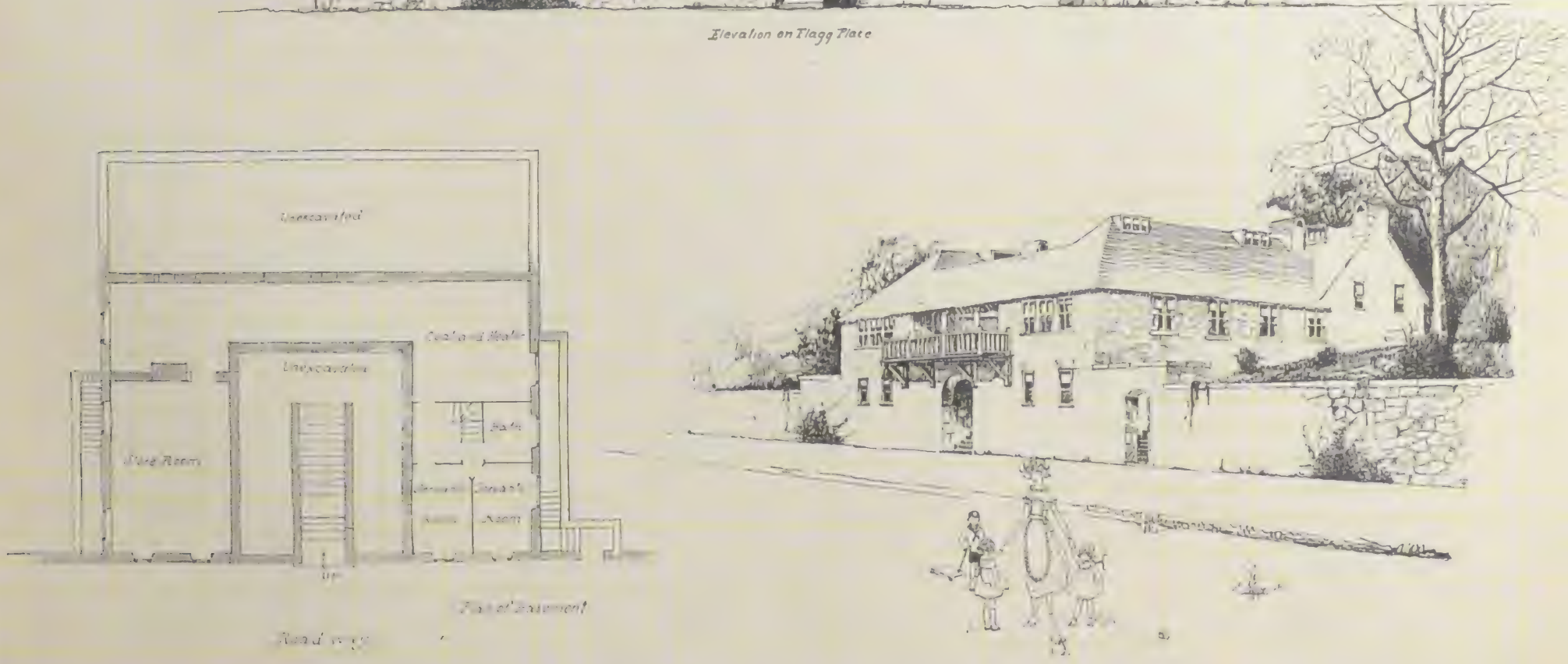
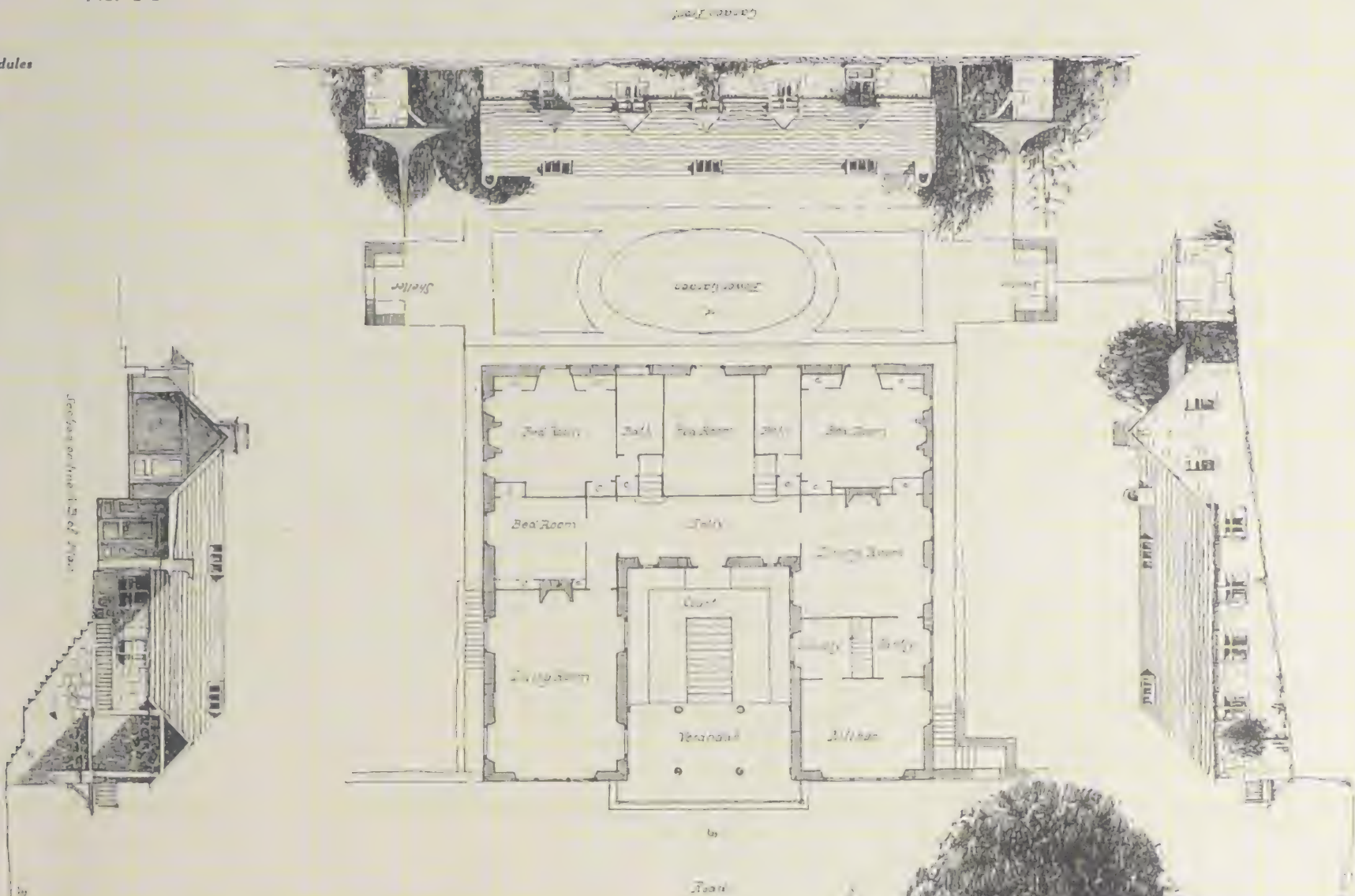
The Greeks, only, seem fully to have understood the supreme importance of the model in design.

Some years ago, at an exhibition of photographs, the prize for artistic excellence was awarded to one of the late George Whiting Flagg, of Nantucket, an uncle of the writer, who, even in old age when the photograph was taken, was strikingly handsome. One of the defeated competitors concluded, wisely, that the subject had more to do with the award than the technique of the photograph. He therefore sought out the sitter, and the next year, with the same subject, himself carried off the prize.

The artists of ancient Greece seem to have been able to secure for their models the finest specimens of humanity which the nation could afford, and this condition undoubtedly profoundly influenced the quality of their work.

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



SMALL HOUSES

Nor was it only in human models that the Greeks exercised great discrimination; in accessories, too, they availed themselves of the finest material which skill could produce. Who, for instance, has not marvelled at the exquisite beauty of Greek drapery; but few modern artists seem to understand that those folds are due to the superb quality of the stuff used as a model. Folds of the kind one sees in the "Victory of Samothrace" occur only in the finest linens that can be made.

In the search for beauty, the part of the model is supreme.

If beauty can be seen it may be interpreted, but if not seen the highest flights of skill or fancy can make but a feeble approach toward the best that may be drawn from nature. The recognition of this fact would do more to elevate art than any other thing, and unless recognized, art of the Greek type is impossible.

One must be strangely lacking in taste who can look over the portfolio of the ordinary pupil at the life class without disgust and repulsion. The beauty of Greek art was acquired in no such way. The portrayal of ugliness is not the road to beauty. The student may gain some knowledge of anatomy from the study of the ugly model, but can no more extract beauty from it than bees honey from thorns.

Why should any one wish to portray ugliness in a world where there is too much of it? What use in trying to preserve anything but beauty? Why should not its cult again be set up on earth, and how can one do better than advance such a cause?

Beauty is one of nature's choicest gifts, and the enjoyment of it one of the keenest of all delights. Let us, therefore, create works of beauty and banish ugly things, for beauty begets beauty as ugliness begets ugliness. The sight of a beautiful object breeds the desire for more of the same kind, while familiarity with ugliness injures taste and debases character. Ugliness is associated with all that is mean, sordid, low, and defective in life, while beauty typifies the opposite characteristics—the pursuit of it leads to refinement, high civilization, and enjoyment of life.

Plate 14

Certain peculiarities of site are of frequent occurrence, one of which is dealt with in this design. It often happens that in grading the road, banks are formed at its sides. These banks afford oppor-

tunities for many interesting varieties of treatment in the planning of houses, and several other designs of this series are also intended for such places. The present one is a rather extreme example of the kind, for the bank is quite high. To reach the house from the road, steps would be needed in any event; a retaining wall is also required. These necessary features are, therefore, just so much more material in the hands of the designer with which to produce a fine effect. There are also other reasons for incorporating the wall and steps into the composition; much material is saved thereby, for the wall may be utilized as a part of the substructure of the building, and take the place of other foundations and walls which would be required if the house were differently located. Then, too, if it were placed farther back on the plot, available space for the garden would be reduced. But the greatest loss would be in the opportunity, here presented, to escape from the commonplace.

The site is of the finest: on the brow of a hill overlooking a mile of rich lowland with the sea beyond.

The house is built around a square court, enclosed on three sides by the building proper, and on the ocean side by a covered verandah, partly supported by brackets, overhanging the road. The approach to the court is by a flight of stone steps through an arch in the wall under the verandah, so that to reach the house from the road, one comes up through the bottom of the court, so to speak, the main entrance being in full view as one ascends the steps.

To better accommodate the house to the site, the row of bedrooms along the garden front is raised one module, or 3' 9", above the rest of the main floor. It may seem strange that the principal living-rooms do not face the garden. They would have done so were it not for the superb water view which the other side commands.

The house consists mostly of a single floor, all the rooms of which have ridge-dormers and their ceilings follow the slope of the roof, as usual in these designs. The servants' quarters are in the basement, but at a considerable elevation above the road. On the far side of the road there is a steep descent; so the ground on which the children are standing in the perspective exists only in the imagination of my daughter, who drew them. The proper place for these small people is on the garden side, where there is an abundance of land about the Mother Hubbard summer-houses. The bed-room casements on that side open to the ground.

ROOF-COVERING

MOST good-looking things are expensive, and this is certainly true of roofs. As a part of the plan of cost reduction which this work illustrates, it was necessary to contrive a roof which should be both good and cheap. About the cheapest roof-covering on the market is composed of fibrous material in combination with asphalt—a sort of glorified tar-paper. Different manufacturers have different names for it. “Perroid,” “Rubberoid,” and “Everlastic” all belong to the same family and are very good; that is to say, they wear well. The drawback is that, as usually laid, they are sordidly cheap in appearance and devoid of taste. But the material has its good points; its faults lie chiefly in the laying; it comes as imitation shingles or else in strips 3' wide. When put on in strips of that width the edges are cemented together with an unsightly black compound and fastened with nails driven through tin disks or washers. Soon after laying, the material swells and buckles—the tin disks are apt to rust and the whole thing presents a forlorn appearance.

The imitation shingles are, as the name implies, a sham, and, as usual with shams, wasteful of material. Shingles, slate, tiles, etc., necessarily have vertical joints because they come in small pieces, and, in order to prevent water from getting through the joints, the pieces must be lapped, so that at each vertical joint there shall be a plane surface below to catch water which gets through it. To overcome this difficulty constitutes the heaviest part of the cost of such roofs. With shingles, the lapping necessitates three layers. A shingle 12" long has only 4" to the weather, the rest, or two-thirds, being required to overcome the disadvantage inherent in the vertical joints. Now, to deliberately make such joints in material of the kind we are speaking of, where there is no necessity for them, is a queer proceeding, to say the least. It is done in order to obtain somewhat the appearance of shingles; in other words, for æsthetic reasons; but what a strange condition of taste does this represent, and how much at variance is it with common sense, the first rule of good taste.

It occurred to the writer that if this material were cut in narrow strips and laid with an overlap, leaving the lower edge comparatively free, it would not buckle, and thus the chief objection to its

use in strips would disappear. Experiments proved this theory correct. That these roofs are not altogether unattractive in appearance may be seen by the photographs. The roof shown in Photograph 22 had been in place about two years when the picture was taken. The oldest roof of this kind has now been on about five years, during which time it has required no repairs and shows little evidence of wear. The cost is considerably less than that of any other roof of equal appearance with which the writer is acquainted.

The procedure in laying these roofs is as follows: the 3-foot wide roll of material is cut into four strips of 9" each; these strips are laid with a 2-inch overlap, leaving 7" to the weather; but first the



No. 23

Roof covering which had been on one year when photograph was taken.

rafters are covered with sheathing, and the sheathing with good building-paper, or tar paper. On this, at intervals, chalk lines are snapped as guides for the nailing; that is to make sure that the nails shall be in vertical lines up the roof. The nails are driven through clips of the kind indicated on Figures 3 or 4. Before the first strip is laid, if there is no built-in gutter, a row of clips is nailed along the lower edge of the sheathing at the eaves, the turned-up ends being flush with the bottom line of the board; the clips, of course, are spaced according to the chalk-lines. The lower edge of the first strip is placed against the upturned ends of the clips, which are afterward bent down over it to keep the wind from getting under; then another row of clips is nailed along the upper edge of the strip, so that their upturned ends are 2" from the top, ready to serve for the second strip, and so on. The nails, of course, and the clips, too, except the ends, bent over, are covered by the overlap (see Figures 1 and 2). The vertical markings are produced by the weather. These lines begin to make their appearance a month or two after the roof is laid, and are an attractive characteristic of this kind of roof. At gable ends and other places, where the thin, paper-like appearance of the covering would otherwise be apparent, an angle piece of sheet metal is laid at the end of every strip. This improves the appearance and protects the end of the strip from injury. In valleys, at angles, or for flashing at chimneys and other places, an



No. 22

Roof covering which had been on two years when photograph was taken.

SMALL HOUSES

18-inch strip of the covering is employed. The writer has used this kind of material for flashing for the last ten years, and up to date has never had a failure with it. It seems to last better than any available material except sheet copper or the best galvanized iron.

Roofs of the kind above described are very quickly and easily laid; they require about one-half as long to put on as a shingle roof, cost less, and look quite as well. There seems to be no reason why they should not last as long as the ordinary shingle roof.

Where the ceilings of rooms go directly up into the peak of the roof, with no furred-off space such as is obtained by the use of the "standard truss" (see Plate 37), care must be taken to thoroughly insulate the roof against cold; it should certainly be as well protected as are the sides of the ordinary frame building. For this purpose nothing is better than good building-quilt.

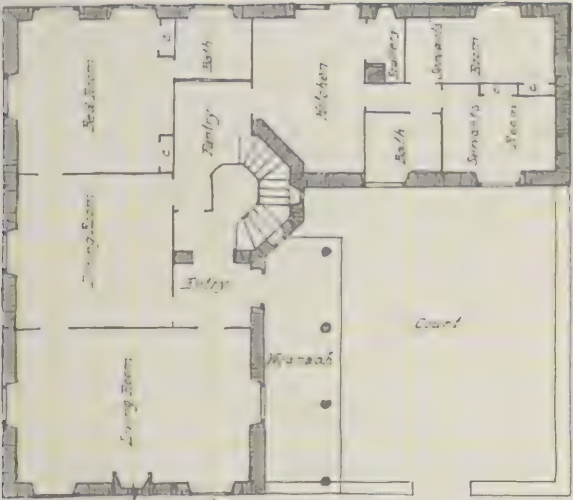
Plate 15

This plan consists of a main body, a wing forming an L, and stairs in the re-entrant angle. It has three masters' bed-rooms and a bath-room on the upper floor, and one bed-room with its bath

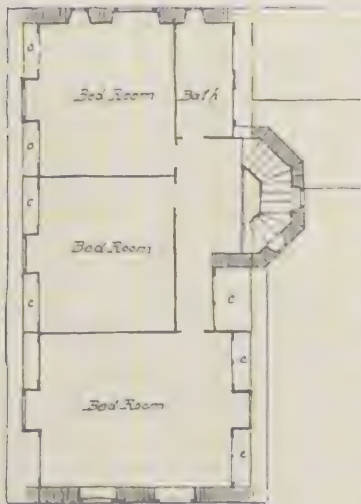
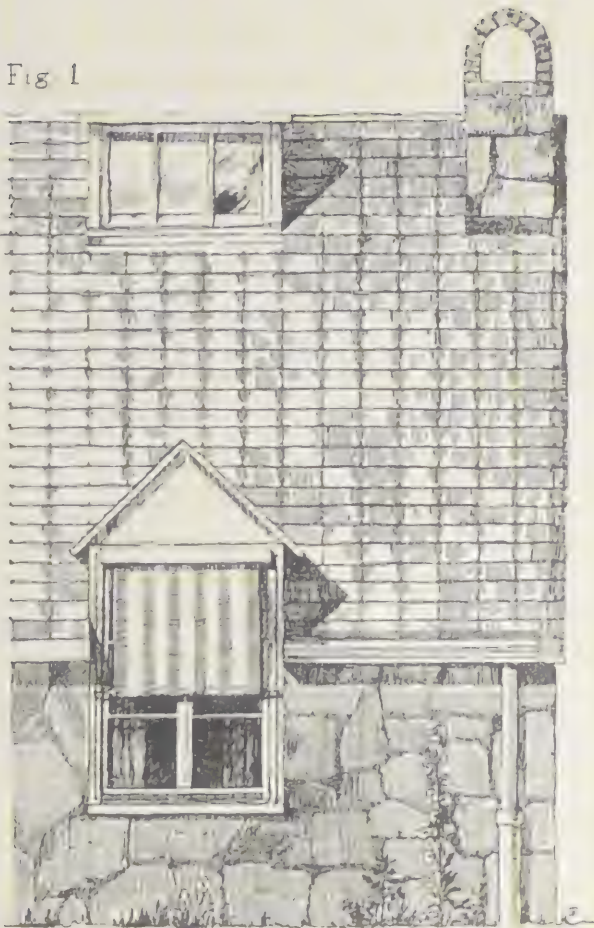
on the ground floor. This bed-room is entered only from the dining-room, but with a little contrivance might be entered from the stair hall. In plans of this type more space is usually required for the entry and stairs than in some others, but liberality in this respect is desirable when it can be afforded, for nothing detracts more from appearance than cramped entries, corridors, and stairs. It is also desirable, when possible, to provide sufficient space at the head of stairs to produce an agreeable air of freedom or openness. Such places are often also of great use in other ways. The reduction of all things to a minimum, as is done in most of these designs, can only be justified on economic grounds. Many of the designs could be greatly improved by slight increases in size, but it is always easy to add and correspondingly difficult to contract a plan. The designs therefore, as a rule, represent a minimum of what should be had in houses of the various classes to which they belong. They are all suitable for enlargement simply by a slight increase in the size of the module, thus increasing the area of the rooms and providing space for additional closets if needed. Additions and extensions might also be made in many places with great advantage both to the external appearance and internal convenience of the house.

Table of Modules

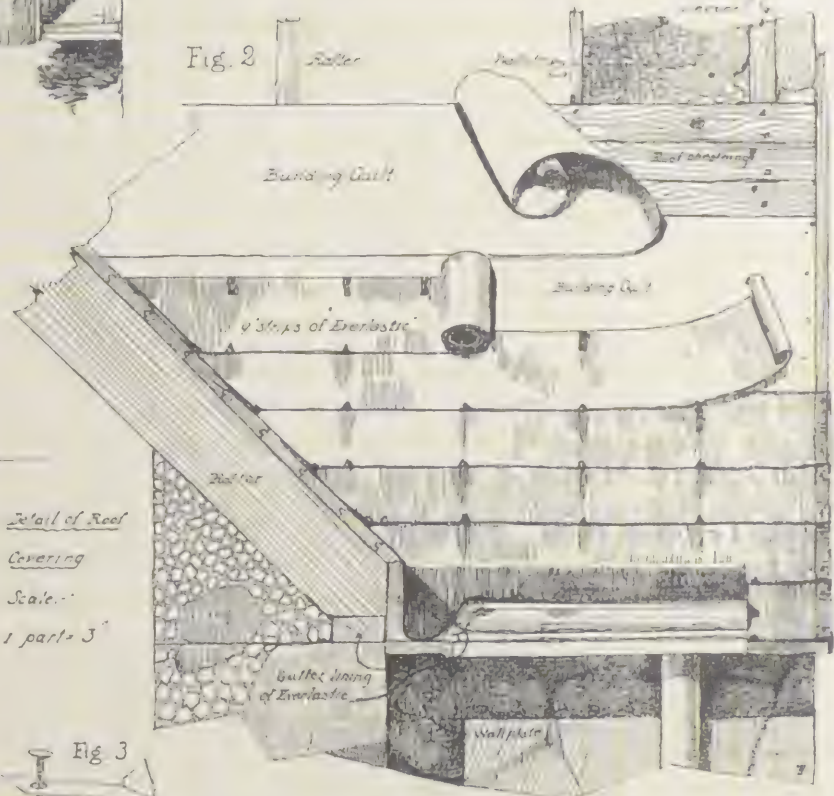
1 m	= 3'-9"
2 "	= 7'-6"
3 "	= 11'-3"
4 "	= 15'
5 "	= 18'-9"
6 "	= 22'-6"
7 "	= 26'-3"
8 "	= 30'
9 "	= 33'-9"
10 "	= 37'-6"
11 "	= 41'-3"
12 "	= 45'
13 "	= 48'-9"
14 "	= 52'-6"
15 "	= 56'-3"



Detail of End of Kitchen Wing
Scale: 1 part = 9"



Plan of upper floor



Detail of Roof Covering
Scale: 1 part = 3"

Fig. 3
Sheet metal clip

Patented Aug. 20 1911

Fig. 4

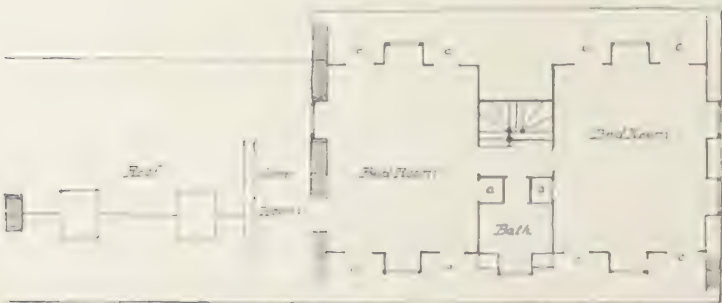
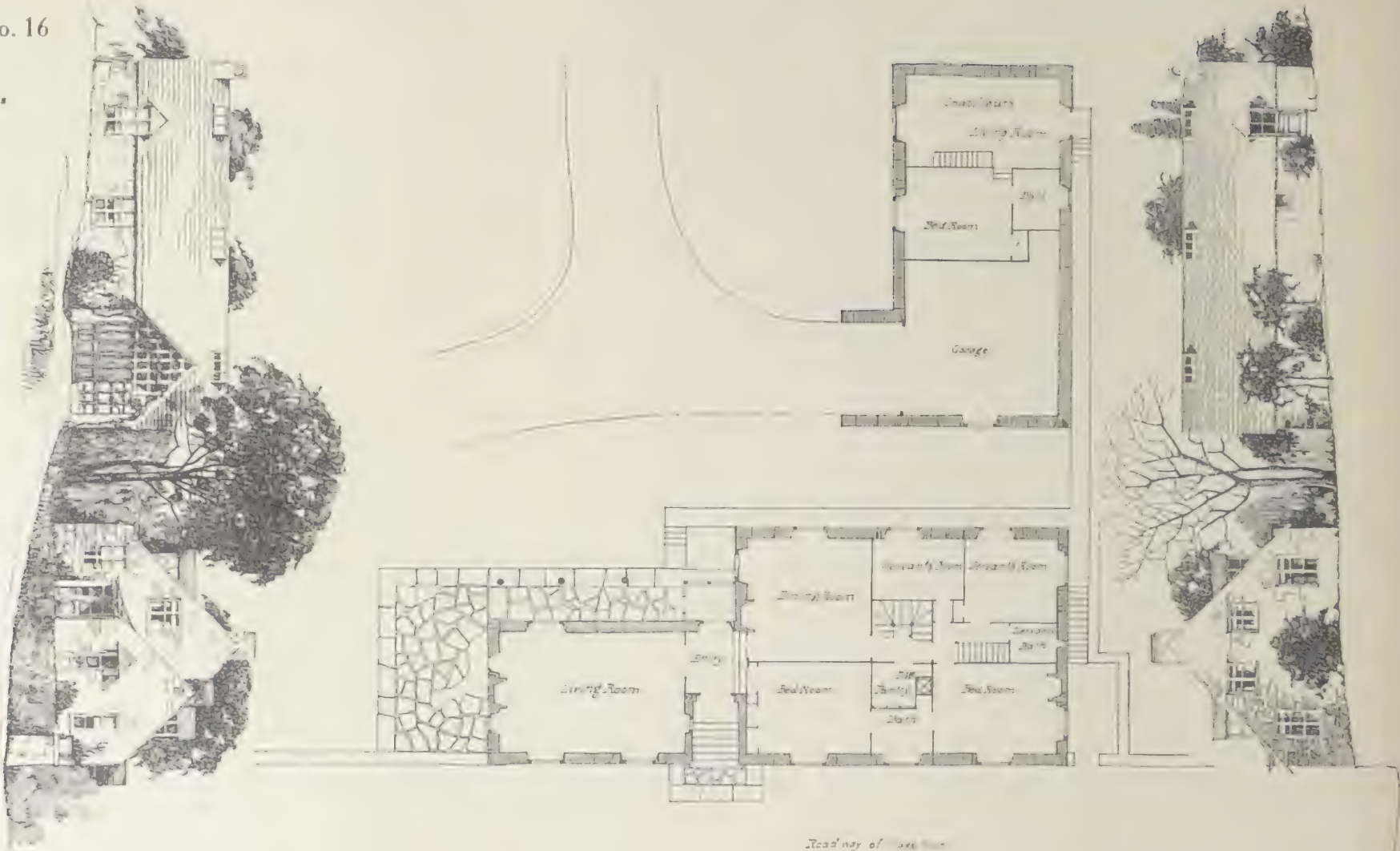
Wire clip



No. 16

Table of Modules

1	m	-	3'-9"
2	"	-	7'-6"
3	"	-	11'-3"
4	"	-	15'
5	"	-	18'-9"
6	"	-	22'-6"
7	"	-	26'-3"
8	"	-	30'
9	"	-	33'-9"
10	"	-	37'-6"
11	"	-	41'-3"
12	"	-	45'
13	"	-	48'-9"
14	"	-	52'-6"
15	"	-	56'-3"



DEPENDENCIES

IN designing small houses, if one wishes to obtain the full value of his opportunity, he must make full use of the dependencies in his composition. If there is to be a fence, wall, shed, garage, or other construction connected with the house, it should be utilized to form an integral part of the design and add to its general importance and beauty. This is especially true in designing cheap houses, for here the designer has so little material at his disposal that he cannot afford to dissipate any part of it. One who tries will often be surprised to find how much can be done with very scant materials when all are mobilized and used with care; a bit of wall or a fence, properly placed, may greatly modify the character of the design and give to it a degree of importance out of all proportion to the means employed. A small garage, well placed, in combination with a small house may together make up a composition having an air of dignity which neither would possess without the other. Terraces, arbors, trellises, hedges, and trees may all become powerful



No. 24

House, on Flagg Place, Staten Island, known as the "House-on-the-Wall."

a good effect, it is easier to do so where the grouping can be done with symmetry, because in that case the subordinate parts become so evidently a part of the composition. Consider, for instance, the garden front of Design No. 14. In it the two little summer-houses, symmetrically placed with respect to the main building, combine with it and extend the composition to include them both. Thus at very small cost the importance of the design is greatly increased. The same kind of result is obtained in No. 23, where at slight expense the extent of the design is tripled, and the fine effect obtained will again be increased by the grouping indicated on the block plan. Designs Nos. 9 and 25 are other instances of this sort.

How topiary may be used to obtain these results is discussed in essay on that subject, Part LI, and some idea of the surprising effects obtained by French architects in this way may be seen in the accompanying photographs. Illustrations of what may be done on a more modest scale appear on Plates 28 and 51.



No. 25

Living-room, "House-on-the-Wall." Ridge-dormer obscured makes room seem gloomy.

aids in producing fine effects, and by such means one may often, at little cost, escape altogether from the commonplace.

On most of these plates little attempt has been made to show dependencies, but on others sufficient has been done to illustrate the importance of the subject. For instance, in the design on Plate 16 how large a part in the composition is played by the stone retaining wall. Without it the house would lose half its importance and the whole character of the design be changed (see Photograph 24). The wall not only adds almost as much to the composition as the house itself, but lifts it out of the ordinary. Here then is a case where the effect of the wall upon the appearance of the house is all out of proportion to its cost, even if the wall served no other useful purpose.

In this design, too, the garage adds much to the appearance of the house; the two buildings together form a group possessing importance and dignity, which neither would have singly.

While an unsymmetrical arrangement of this sort may produce



No. 26

Dining-room, "House-on-the-Wall."

SMALL HOUSES

The disposition of fences, walls, hedges, outbuildings, and even the house itself to form forecourts, which always add dignity and interest to the design, besides performing other useful functions, is illustrated on Plates 4, 5, 10, 13, 14, 15, 22, 29, 31, 38, 42, 44, 49, and 51. This is a mode of treatment of which comparatively little use is made in this country, although one of the easiest ways of obtaining a fine effect.

The disposition of dependencies calls for the exercise of economy and good taste. Waste of opportunity in designing small houses is a very common form of extravagance. Materials which if made the most of would produce an artistic and interesting composition are often frittered away and lost through want of appreciation of what could be made of them.

Plate 16

This house is set a few feet back from the building-line, thus making the road appear wider in front of it. The design gains dignity on that account. The roadway at this point is about 4' below the bank on which the house stands. The main entrance is reached by stone steps in a recess in the face of the wall, covered by a stone vault. The projecting hood, which gives additional protection to the entrance, forms a sort of marquee, so that one may alight from a vehicle at the door under cover.

To the left of the entry, on entering, is the living-room, which occupies all the rest of the wing; the ceiling goes up to the peak of the roof, and is lighted and ventilated, in its upper part, by ridge-dormers (see Photograph 25). The entry can also be reached from the garden front through a glass vestibule under the veranda. To the right, as one enters from the road, is the dining-room (see Photograph 26), beyond which are two servants' rooms and a bath. Two masters' bed-rooms and a bath, along the side toward the road, occupy the rest of this floor. The upper floor contains two more bed-rooms and another bath-room, making four masters' bed-rooms and two bath-rooms in all, and two bed-rooms and one bath-room for servants, besides the rooms in the garage building. The kitchen, in the basement, is connected with the dining-room by a dumb-waiter.

It was first intended to place the kitchen on the main floor where the servants' rooms are, and the servants were to be lodged in a part of the garage building, but subsequently the plan was changed.

The garage buildings contain beside the garage proper, a lodgment of three rooms and a bath for the chauffeur. The end room following the slope of the hill is elevated one module above the rest of the main floor; its ceiling, extending up to the peak of the roof, is provided with a ridge-dormer. The rest of the building has a loft which receives its light from the ridge-dormers only.



No. 27

"House-on-the-Wall" from the south.

ARCHITECTURE AND ARCHÆOLOGY

TO produce the best animals, the breed should be kept pure, mongrels are never good. This applies to art precisely as it does to animals; mongrel art is no good.

The truth of this becomes immediately apparent when one looks back through the history of art. Results are always best where the styles are purest. The Greeks labored for a thousand years in perfecting the design of their temples; always engaged on a single type of building, without the admixture of any foreign element.

The builders of western Europe, in like manner, labored with one aim constantly in view—almost from the time of the downfall of the Roman Empire until the end of the twelfth century, a period of about eight hundred years, before their efforts were crowned with complete success. During all that time the only admixture of foreign influence in France was at Perigueux and the surrounding provinces, where the Byzantine influences, introduced by the returning Crusaders, acted as a check, in the region affected, to the steady advancement of the national style.

During the development of styles in France, from the Renaissance to the Revolution, foreign influence was almost completely excluded, and changes in fashion followed each other in regular and orderly sequence, all the minds engaged being occupied in adapting or improving what they saw about them.

The same thing was seen here in the development of style which took place during the one hundred years between the time when the colonists first began to prosper and about the commencement of the last century. With the nineteenth century opened a most disastrous epoch for western architecture. The fundamental principles upon which it had always rested and to which every truly great production had been due, now began to give place to architectural archæology—a practice which, like an insidious poison, has sapped the art of its vitality and undermined its very foundations.

Reason, which had hitherto governed, no longer held sway. The orderly evolution of styles or fashions ceased, and the copying of former styles was substituted for it. Invention was succeeded by imitation, and with it the progress of architecture as a fine art, in great measure, ceased, for the practice of archæology in the guise of architecture became common. Is it possible to imagine deeper degradation to which art could sink?

To such a pass have things come that as Gaudet, speaking of French church architecture, says: "The architect of to-day puts to himself in good faith this monstrous question, the mere statement of which at any other epoch would have branded him who made it a fool. 'Shall I, artist of the twentieth century, make my building of the twelfth, thirteenth, fourteenth, fifteenth, or sixteenth centuries?' And so deeply has the evil penetrated, that he does not even comprehend the idiocy of the proposition." What applies here to churches only in France, applies to all architecture in most other countries.

When one looks for the cause of this strange and disastrous manifestation, he finds it originated in the enthusiastic admiration for classic remains as revealed by the discovery of Pompeii; the publication of the many works on classic architecture which followed, and most notably Stewart and Revett's "Antiquities of Athens." The beautiful examples of architecture thus revealed engendered a

desire to copy them; that is to say, to practise archæology instead of architecture; and progress in art stopped, as if by a blight, for reason, an essential element of good design, was discarded.

In this country, up to that time, the builders had been engaged in adapting the classic forms inherited from the mother country, to the material employed here in building, and the structures to their uses. The classic proportions were modified to make them suitable for wood, and new forms, in great variety, invented in so doing. All this now gave place to the slavish imitation of Greek models, with the result that bad archæology was substituted for good architecture. The light, fresh, and graceful forms and details which they had created, when following the sound principles of design, were succeeded by heavy imitations of stone architecture, carried out in wood; the structures were no longer adapted to their uses; but the Greek temple became the model for every kind of building, and queer imitations of it sprung up all over the land. It seemed as if every one had suddenly become obsessed with the desire to live in a Greek temple, and the same form was used for churches and public buildings of all kinds. The Colonial style was killed at a blow.

Having abandoned their live architecture and the true course in design, the builders were now subject to every whim. The publication of Pugin's and Rickmann's works, and others on Gothic architecture, started a new era of archæology, and the desire to live in Greek temples was succeeded by a similar desire to live in what were supposed to be Gothic buildings. After that the flood-gates were opened. The multiplication of illustrations and the introduction of photography led to the copying of all kinds of styles, and building became a veritable archæological salad, the like of which had never been seen on earth—Egyptian, Italian, Tudor, Queen Anne, Romanesque, Colonial, French, and a hundred other imitations, but nothing that could be called American, unless it be the comic mixture produced.

Slavish copying leads nowhere in art. Every production that has stood the test of time, and is regarded as a masterpiece, was, when made, strictly modern; that is, in the style of its time and place.

From all of which it appears that the multiplication of illustrations and books on various styles of architecture have been anything but wholesome for the art; because they have served to substitute archæology for architecture, to stop invention and the orderly progress by which styles are evolved, and which occurs only where all are engaged in the effort to improve the work which they see about them and thoroughly understand.

In France alone, of all western countries, has the drift toward archæology, in great measure, been withstood. There only does the national style maintain its orderly evolution, and there only does architecture, as a veritable fine art, hold her ground comparatively free from the blight of archæology.

When a pupil at Ecole des Beaux Arts, I was once engaged on a design for three houses on an irregular plot. I had recently made a tour of the provinces and became enamored of the beautiful remains of sixteenth-century architecture which I had visited. In my design I drew inspiration, as the saying is, from the Hôtel d'Eco-ville at Caen. Working next to me in the studio was a young Frenchman, engaged on the same problem, but doing so without the aid

SMALL HOUSES

of archæology. His design was unmistakably French of the nineteenth century, and very ugly it appeared to me. He often expressed his admiration of the beautiful motives I was so freely borrowing, and spoke in no very respectful terms of the style he himself was using. I asked him why he did not do as I had done, and take for a model something good-looking. "Nothing I should like better," said he, "and to-morrow I shall ask the Patron to let me do so." But when the morrow came, "the Patron" would have none of it.

He did not say it in so many words, but his meaning was plain. For me, a foreigner, it was all right; I might practise archæology if I chose; it did not matter; but for a Frenchman, No—emphatically NO!

Monsieur Blondel was right. He knew, as every other eminent French architect knows, that the road of archæology in architecture leads nowhere. To yield to the temptation is to abandon progress; to detach oneself from the evolution of modern art and go backward, not forward. The logical Frenchman understands this thoroughly and cannot be beguiled into the ways of archæology. The national style of the time may be ugly, fashions often are; but then it is the duty of every one using it to contribute his mite or talent, as the case may be, toward its beautification; but to abandon modern architecture for some bygone fashion which reflects neither the spirit nor civilization of the time—to abdicate the function of architect for that of archæologist—is to confess defeat and enter a blind alley. The national style, for the country fortunate enough to have one, is a priceless heritage from the ages—a living thing—an evolution in progress, always advancing, always changing, always reflecting the habits, manners, and art of the time.

Before the blight of archæology withered it, we had such a style, and in practising it produced works of art which, however humble they may have been, restricted as they were by the limited resources of the time, nevertheless compared favorably with the contemporaneous art of any other people. Why can we not again set ourselves on the right path, cast off archæology, and think and invent instead of copy, borrow, and adopt?

Soon after my return from Paris I was consulted by a prominent citizen of New York, who intended to build a great mansion on Fifth Avenue, as to what French architect or architects he had best apply for plans. I recommended my former master, Paul Blondel, than whom no architect in France stood higher, also Monsieur Daumet, architect of the Château of Chantilly for the Duc d'Aumale, and who was associated with Monsieur Girault, since architect of the Petit Palais of the Champs Elysées, of the royal palace for the King of Belgium, etc. My friend applied to Messrs. Daumet and Girault; the latter made the sketches, which were altogether worthy of his great genius. They called for a work of art of the highest type. I saw the design and shall never forget its beauty; but it was not what was wanted. The drawings called for a work of architecture;

the American taste demanded archæology. They called for a building of the nineteenth century; my friend wanted one of the fifteenth.

That there could be anything absurd about this never entered his head. He told me that he was more than pleased with the sketches, because, having made inquiry in Paris, he was convinced that he could have placed the work in no abler hands. So he was fully satisfied nothing suitable was to be had in France, and felt he was making no mistake in employing an American.

From an American architect he had no difficulty in obtaining a very beautiful archæological study, which when constructed satisfied his taste and, it may be supposed, the taste of the community.

For a hundred years architecture in the United States has been suffering from a toxic dose of outside influences brought on by a multiplicity of illustrations and the consequent abandonment of those old methods upon which architecture as a fine art depends for its very existence. Architecture is alive, archæology is dead. Inspiration and instruction may be drawn from the dead, but when more than that is attempted—when it is sought to infuse the dead past into the living present—the result is withering.

There is only one sure way to correct this evil and to draw us out of the slough into which we have fallen, viz.: to revert to the true principles of design, the first of which is reason, or common sense.

During the last twenty-five or thirty years a great many young men have gone from here to Paris to study architecture; but except in few instances they have brought home the shucks of the French teaching rather than its spirit, and missed the kernel, which is the reasonableness of it all. They have failed, for the most part, to acquire that appreciation of the fitness of things upon which the whole structure of French taste is founded.

In the designs of these little houses the aim has been to begin at the foundation, so to speak, to use simple and primitive forms and methods, with the hope that they may commend themselves, and prove a new basis in house design, and so aid in establishing a more healthy environment for future growth.

Plate 17

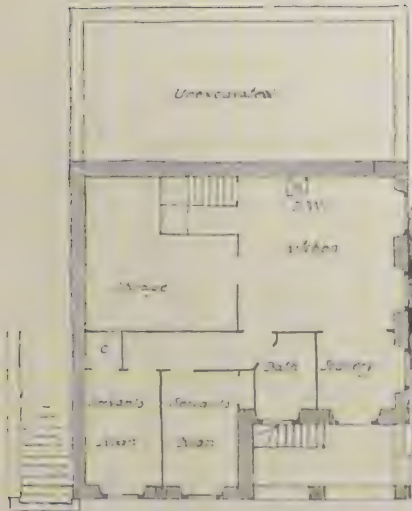
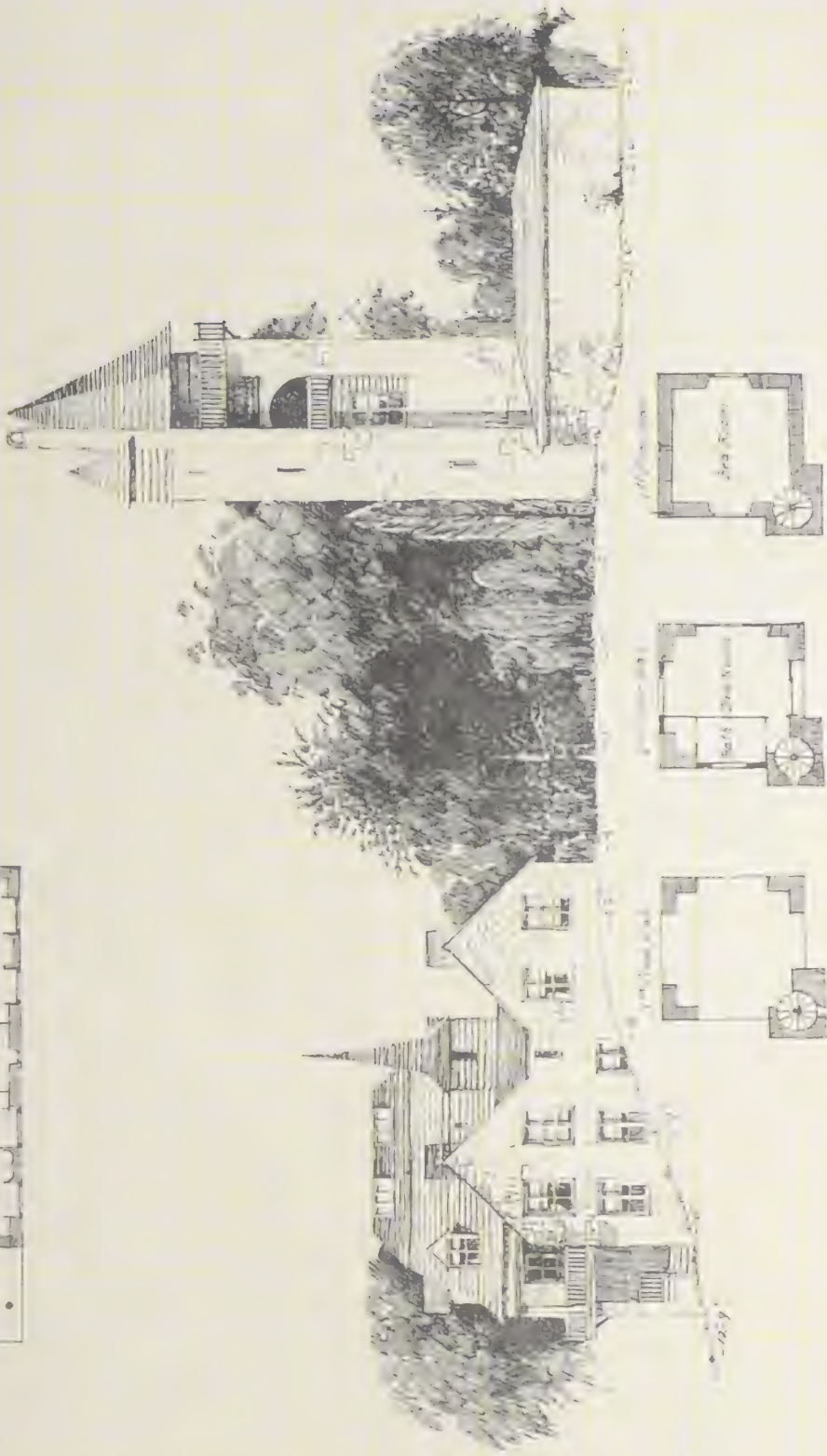
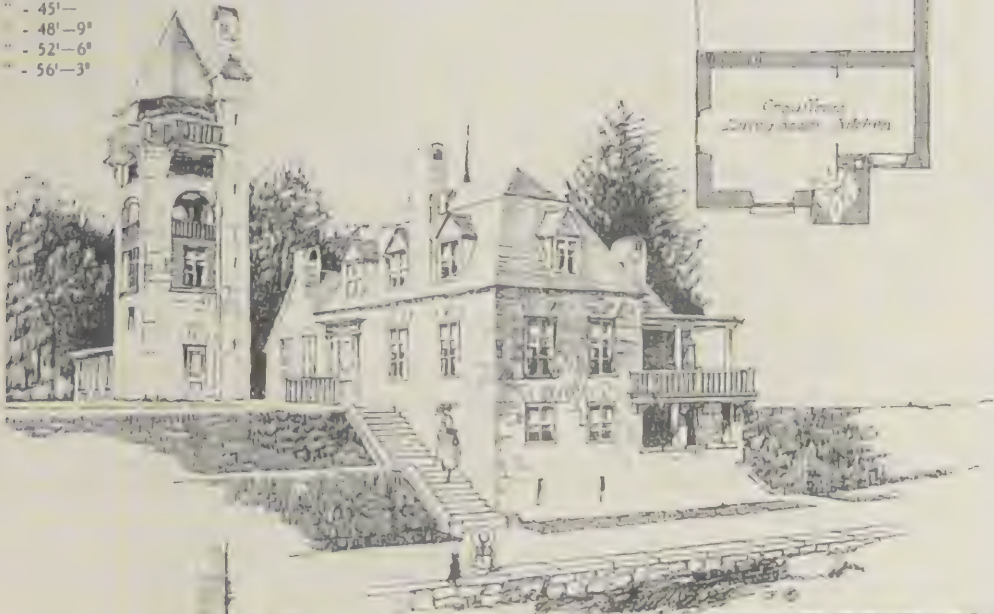
This design calls for a group, consisting of a house and water-tower in combination with a garage. The house stands on a sloping bank by the side of the road, and the water-tower on high land back of it. The main entrance to the house is reached by a flight of steps from the road along the west wall. The service department is in the basement, which is well above ground. The plan will explain itself. The garage is attached to the base of the tower and the chauffeur's quarters occupy three floors of the tower. The rooms are reached by a spiral staircase in the turret. The tank itself forms the upper part of the tower and supports the conical roof which covers it.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

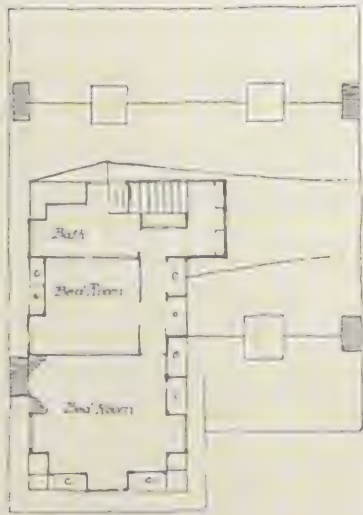
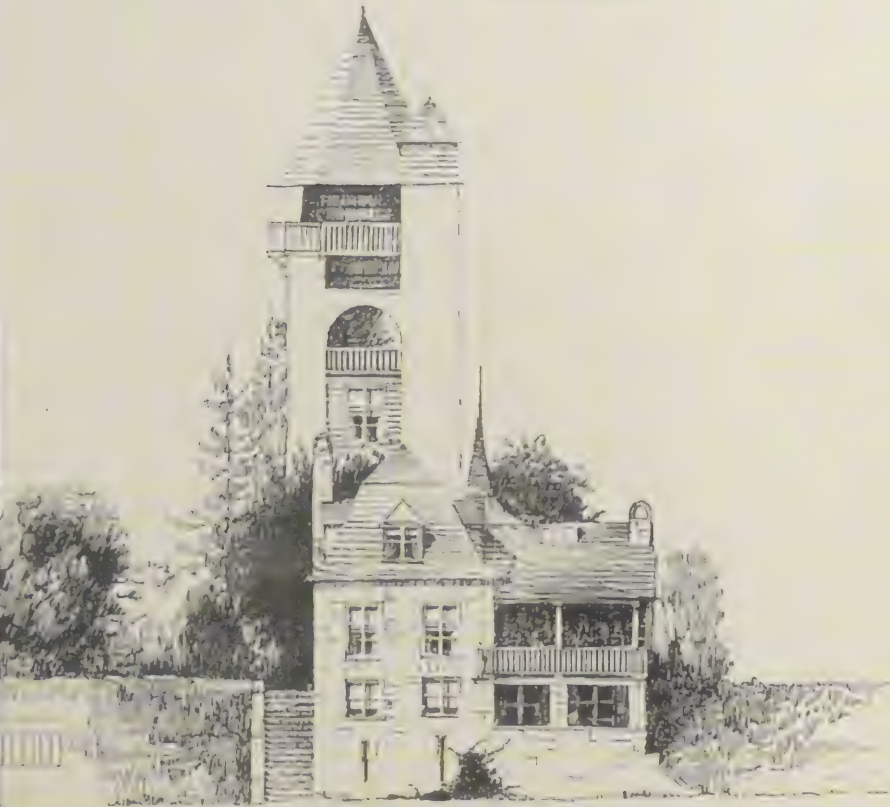
No. 17

Table of Modules

1 m	-	3'-9"
2	-	7'-6"
3	-	11'-3"
4	-	15'-0"
5	-	18'-9"
6	-	22'-6"
7	-	26'-3"
8	-	30'-0"
9	-	33'-9"
10	-	37'-6"
11	-	41'-3"
12	-	45'-0"
13	-	48'-9"
14	-	52'-6"
15	-	56'-3"



Plan of Lower Floor



Plan of Upper Floor

FOUNDATIONS AND CELLARS

THE system of building which is the object of this work to explain and illustrate has for its chief characteristic the ridge-dormer. The use of this feature leads to several important modifications of usual methods. It affects the plan, construction, and external appearance of the house. The ridge-dormer tends to decrease height, for it renders space directly under the roof desirable for use in rooms and makes it possible to lower the height of the building by the amount saved. As the space thus gained is—thanks to the ridge-dormer—both the least expensive to build and the most desirable to have, it follows that the tendency in planning is to obtain as much of it as possible by extending the building horizontally rather than vertically. Under ordinary methods the tendency is all toward height, for height may be increased without materially increasing cellar or roof areas. The omission, therefore, of a second story, under ordinary conditions, is not an economical thing to do; but under this new method the case is otherwise. Because of the lowness of the walls, the omission in great part, or altogether, of the cellar, the cheapness of the space utilized in the roof, combined with less expensive ways of building roofs and foundations, space in the one-story building may be had quite as cheaply, per unit of floor area, as in the two-story house.

Small houses generally have larger cellars than needed, because where the area of the house is small, little or nothing can be saved by omitting a part of the cellar, for the necessary cross-wall between the part excavated and the part unexcavated, not otherwise required, offsets the saving in excavation; but where the area of the house is greater, it is not so.

The construction of the cellar under the whole area of the house has several disadvantages. The house, if properly constructed, would be more sanitary without it; it increases the cost both of building and heating, tends to raise the height of the structure, and adds to fire risk, for most fires originate in cellars.

Were it not for the heating apparatus, which convenience usually requires to be placed at a lower level than the part to be heated, there would be no cellars under these houses. The cellar costs more to build than any other part, because in addition to the cost of the walls there is the expense of excavation. Storage space of equal size and better quality can be built above ground for much less than the cost of a cellar, so the omission of the cellar would improve both the quality and healthfulness of the house, while reducing its cost.

There is a popular prejudice here against the omission of cellars, but it is a mistaken one. It is said that when houses were first built in the "Back Bay" section of Boston without cellars, people were afraid to live in them, but experience proved them to be most sanitary.

Unless thoroughly damp-proofed, cellars are damp. The walls come in contact with the earth, which is always moist, and this moisture is taken through the walls by molecular attraction. No one thinks of the cellar as a particularly healthy place, nor would care to live in one; yet with a cellar there is sure to be more or less admixture of cellar air with that of the rooms. Does not smoke or gas in the cellar soon find its way all through the house?

The cellar increases the cost of heating by a large percentage, for in a two-story house having a cellar under all of it about

30 per cent of the whole volume of air in the house is in the cellar, and this must be heated if the house is to be warm and free from drafts.

A cellar under the house generally results in increasing heights, because the tendency is to keep the cellar pretty well out of ground, both to save excavation and to obtain better light for it; so the ground floor is usually elevated 2' or 3' above grade, which increases the height of the building and often detracts from its good proportions.

If the cellar is omitted or made under a part of the house only, as in most of these designs, the above conditions are reversed. In that case, economy requires that the floor hug the ground as closely as possible in order to save masonry and fill between the natural ground-level and the floor. So here again the tendency of these methods is to reduce heights. In many of the designs the cellars are made simply large enough for the heating apparatus and storage. In others it is omitted altogether and storage space, in lieu of it, provided above ground.

The ground floor is generally only about one step above grade. Where there is no cellar the floor is made by spreading a bed of concrete over the ground and making its upper surface damp-proof. On this surface are laid strips of wood 1" x 2" to which the floor is nailed; the strips are not fastened to the concrete. By this arrangement all dampness and drafts are excluded, there is no place for mice or other vermin, fire risk is lessened, heat economized, and cost reduced. The concrete slab on which the wooden floor rests costs no more than would the cellar floor, if the cellar had been provided; the flooring costs less, because only one layer of boarding is necessary where otherwise two would be required, and floor-beams with their bracing are saved entirely.

It is evident, however, that the success of this method must depend largely on the economy and efficiency of the damp-proofing with which the floor under the unexcavated part is protected against moisture. Above the ground-level moisture enters from the earth by molecular attraction only; no water-pressure is to be feared. If the molecular attraction is cut off, no dampness can enter the house from the ground.

The means used to prevent molecular attraction in these houses where there is no cellar is as follows: The foundation walls are carried up to within 2" of the ground-floor level and finished off smooth and true; then the whole area inside the walls is filled with earth, well tamped, to within 3" below the top of these walls. On this is spread broken stone which is tamped, then covered with concrete finished smooth and flush with the top of the foundation walls. Over this entire surface, walls and all, is spread a thin layer of Portland-cement mortar mixed with a small amount of crude oil to render it waterproof, and, as an additional precaution, a coat of damp-resisting compound is also applied. If pipe trenches are required, they are lined with boards, damp-proofed on the outside, and installed before the stone is put in place (see Figure 1, Plate 18).

The ordinary way of making foundations under buildings where there are no cellars is to carry the wall down below the frost-line, say 4'.

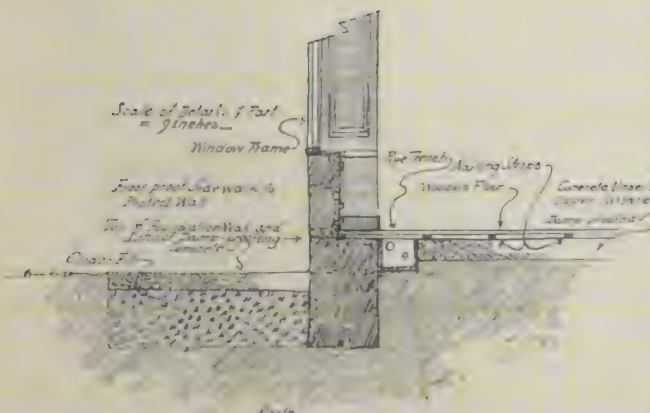
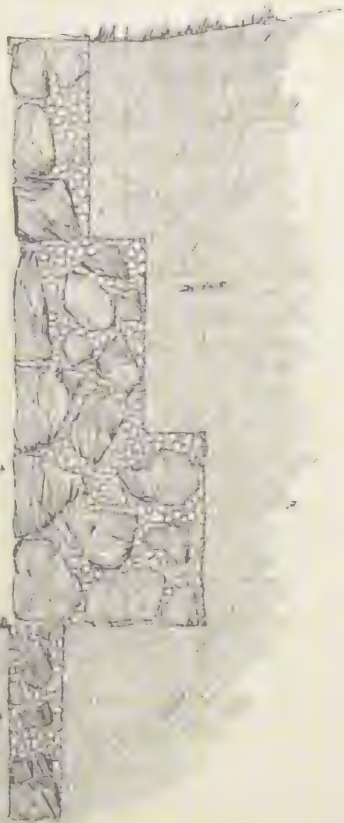
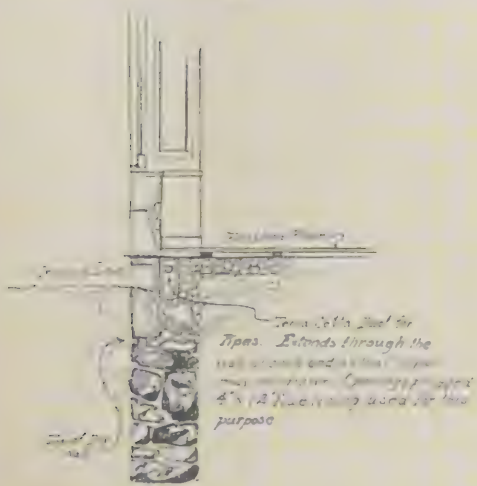
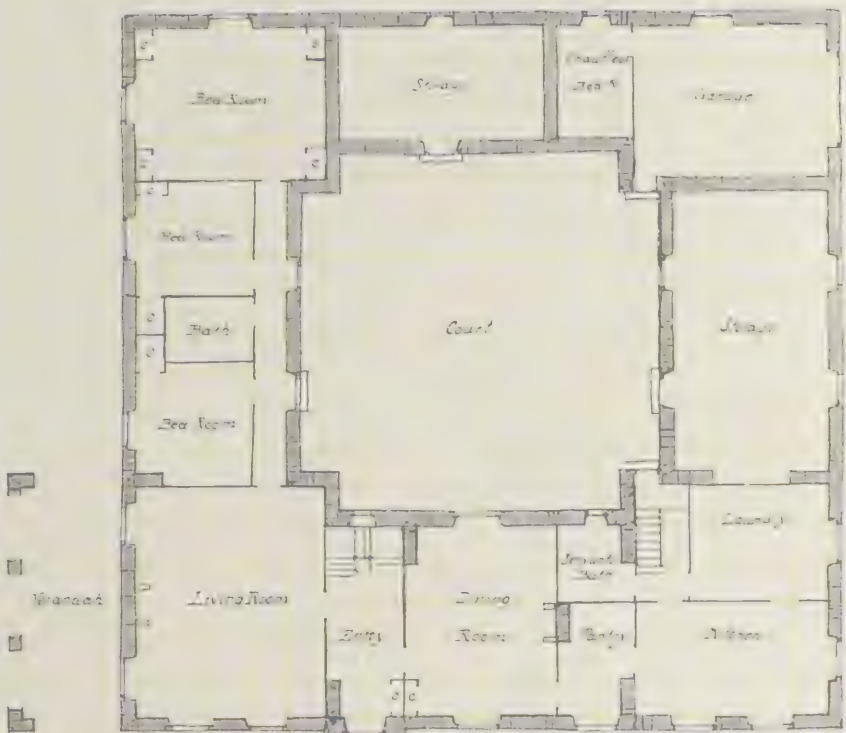
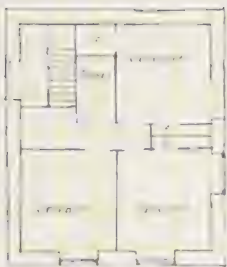
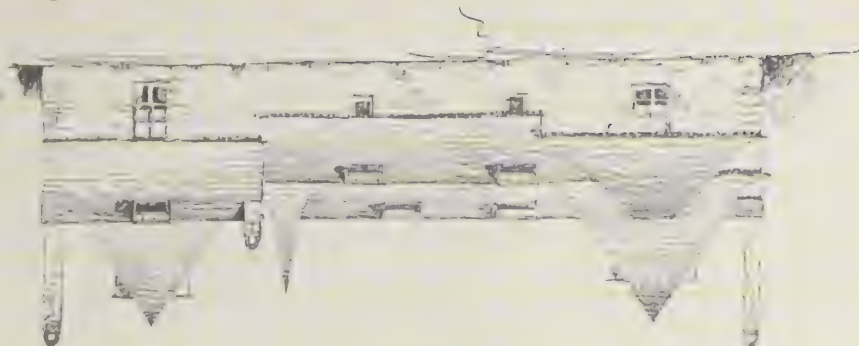
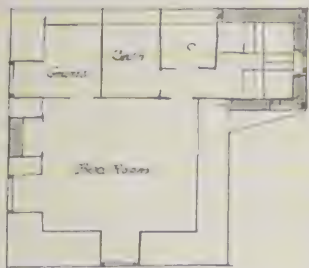
The method used here is simply to go to solid earth, which can generally be found at a depth of about 18". Frost is prevented

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 18

Table of Modules

1 m	= 3'—9"
2 "	= 7'—6"
3 "	= 11'—3"
4 "	= 15'—
5 "	= 18'—9"
6 "	= 22'—6"
7 "	= 26'—3"
8 "	= 30'—
9 "	= 33'—9"
10 "	= 37'—6"
11 "	= 41'—3"
12 "	= 45'—
13 "	= 48'—9"
14 "	= 52'—6"
15 "	= 56'—3"



SMALL HOUSES

from getting under the wall by a frost-proof sidewalk along its outer edge, as illustrated in Figure 1 of Plate 18. The sidewalk costs a little more than the additional depth of wall, but serves a useful purpose in addition to protecting the wall against frost, whereas the deeper footings serve no other purpose. As the walk takes the place of other walks which would be required if it were not there, the saving is considerable. If for any reason the walk is omitted, in whole or in part, then the foundations are carried down below the frost-line as usual, but are laid to within 1' of grade without mortar. A dry wall of this kind costs much less to build than if laid with mortar, is better because molecular attraction of moisture is avoided, and also because the dry wall has a tendency to lower the surface water around the house, which is very conducive to health. If properly made, it is as strong as if mortar was used; but in any case many times stronger than necessary for the low walls of these houses.

The large amount which may be saved by the omission of cellars is not generally understood. In the design of Plate 18 a careful computation shows that by omitting the cellar, under the house proper, enough may be saved to build the two wings, marked storage on the plan, and the garage complete, with its heating, lighting, and plumbing equipment besides, *i. e.*, all that part of the building which encloses two sides of the court. Generally speaking, a one-story building of the kind here illustrated for storage purposes, occupying an area equal to the full area of the house, can be built for less than a cellar. So much storage space would, of course, not generally be required. By dispensing with the cellar, enough may be saved to provide, above ground, all the room needed for storage purposes, as illustrated on Plates 13, 25, and 27, and leave a considerable surplus.

In many of the designs retaining walls are used to support banks

of earth at the roadside or elsewhere. The usual way of building such walls is to carry them, in their full thickness, below the frost line, and as they are very heavy at the base, the cost of doing so is great. Much may be saved by either making use of the walk, as above described, to keep the frost from getting under the wall; or by building a narrow toe-wall along the outer edge only. A 1' wall is sufficient for the purpose (see Figure 2 of Plate 18).

Plate 18

As explained above, this house illustrates the great saving which may be effected by the omission of the cellar. Two sides of the courtyard are enclosed with storage buildings and a garage, at no greater cost than the cellar would involve. Owing to this arrangement, the building appears much more important than it otherwise would. Its extensive appearance is also due to the fact that it is somewhat larger than the average of these designs. Most of the rooms are bigger than usual, and there are more of them. Three servants' rooms are provided as against the usual pair. The entry, too, is larger than common, and a laundry is provided on the ground floor. The size of the house might be reduced, if desired, about 20 per cent, with very little disturbance to the internal arrangement, by moving the main wall back on front and sides one module, and filling in the side recesses of the court. If that were done, the rooms would more nearly correspond in size to those of most of the other designs.

In the arrangement of the interior and segregation of the various departments of the house, the same principles have been used here as elsewhere. The enclosed courtyard is an attractive feature of the building.

XIX

REPAIRS

REPAIRS, to the ordinary house, constitute a heavy charge. When repairs are needed, it pays to make them promptly; but it pays still better to so build as to avoid them. A house in good repair is both pleasanter to live in and more sanitary than otherwise. Prompt repairs stop the spread of dilapidation. A stitch in time saves nine, here as elsewhere; but even when repairs are promptly made, the cost is still a heavy item of expense, which if capitalized would, under ordinary circumstances, be found to represent a very considerable percentage of the cost of the building.

There are two ways to avoid repairs, or rather to reduce them, for repairs cannot be avoided altogether. One is to build better, *i. e.*, to use a quality of material and workmanship that will stand less in need of repair than the ordinary kind. This involves greater cost, and most people while willing to admit the correctness of the theory are not willing to make the increased outlay which it involves. The other way is to eliminate those things which stand in most constant need of repairs; or if they cannot be dispensed with altogether, to decrease their size or number. This plan reduces both first cost and subsequent expense and is the one adopted here.

The heaviest charge is generally for painting. Therefore, parts requiring paint should be as few as possible. One of the greatest advantages of masonry over wood for houses is that it requires no paint; but masonry houses, as commonly built, require a great deal of external paint. They have window-trimmings, blinds, doors, cornices, balustrades, verandahs, platforms, steps, and other features which call for frequent painting, and which otherwise rapidly deteriorate.

In the design of these houses the aim has been to reduce all such features to the minimum, or to dispense with them altogether. Wooden members everywhere are reduced in size almost to the limit; all casing is avoided, while for the most part exterior wooden steps, piazza floors, railings, balustrades, etc., are eliminated. Shutters and blinds never appear, and wooden cornices and other ornamental features are sparingly used.

Fly-screens, ordinarily not very effective, are a constant source of expense and care; they stand in frequent need both of paint and mending and must often be renewed. They are troublesome to take down, put up, and store. In these houses all that is avoided. The mesh being fastened to the window-frame stays there as long as the house endures (see Part XII).

In the interior also, painting is reduced to a minimum. Under the headings "Windows," "Dormers," "Partitions," and "Doors and Trim" it is explained how a vast amount of casing and other unnecessary woodwork are dispensed with, thus saving the first cost of all of those materials and the subsequent cost of painting and keeping them in repair. Not only is most of the ordinary trim and casing omitted, but what remains is of a very much more refined type than common, presenting less surface requiring paint. All horizontal ceilings in these houses are of wood (see Part XXX), and are not painted, but waxed. Doors, frames, and much other interior woodwork is also waxed, as are also floors.

Waxing is the most economical of all methods of treating interior woodwork, and often the best-looking; but the wood should be suitable. Many kinds have beautiful grain, and if simply left in their natural color, with no other treatment than a little bees-

wax as used for floors, will add greatly to the interior beauty of the house. All woods used in this way improve constantly with age, their color becoming deeper and richer as time goes by, provided they have not been spoiled in the first place by stain. All staining of wood is, in the opinion of the writer, an abomination which should be scrupulously avoided. Woods suitable for waxing, such as yellow pine of the long-leaf variety, oak, sycamore, and many other kinds, cost hardly more than white pine and other soft woods of good quality, which require paint; and the waxing costs so little, compared to painting, that it is generally more economical to use such woods for the exposed work of the interior than soft woods. Two very thin coats of wax, well rubbed, will last many years with little or no care. The writer has, in his own house, woodwork so treated which has had nothing done to it except dusting with a dry cloth during the last ten years, and it looks better now than when new. If, for any reason, the wax finish becomes stained, it is the easiest thing in the world to wipe it off and put on a little more, and that can be done by any one, as it requires no skill. Where wax finish is used for interior woodwork, not only is the first cost reduced to a fraction of what would be required for paint, but the cost of maintenance is practically eliminated.

Interior wooden window-sills are places which ordinarily stand in constant need of paint. In these houses such sills are not used. In a masonry house it is cheaper to make the interior sills of cement, which need no repairs, but better still to make them of tiles set in cement. In these houses the sills are made of a single row of 6" x 6" x 1" Ohio red floor-tile laid with $\frac{1}{2}$ " cement joints; they are very attractive in appearance and not harmed by wet. Such sills make an admirable place for flower-stands and never require repair. Moreover, they add to the general handsome and substantial appearance of the house.

The same kind of tiles used for the floors of kitchens, laundries, entries, and other places which require frequent washing, or are likely to be wetted, reduce repairs and make housework light, for they are easy to clean and will stand hard wear for years without injury. The least possible amount of woodwork should be used in kitchens, pantries, laundries, sculleries, and bathrooms. Wooden floors, wainscots, bases, etc., should be avoided in such places, both for sanitary and economic reasons.

Kitchen, scullery, and pantry sinks are places which receive the hardest use, and which either require constant repairs or look shabby. For kitchen and scullery sinks it is best to use galvanized iron. Such sinks are not so attractive as porcelain at first, but better in the long run. Porcelain sinks do not wear well, under the kind of usage generally received in such places, and soon become sorry objects; while the galvanized-iron sink, never very beautiful, retains what good looks it has indefinitely. The best of all sinks for pantries is made by using sheet copper for the sink, drain-board, and back all soldered together in one piece. The first cost of this is considerable, but in the long run it is economical, and if kept clean, always a joy.

Base-boards, as ordinarily used, are things in constant need of painting; but in these houses there is little to them. Bases as usually made are too clumsy to look well and cost two or three times more than necessary (see Part XXI). The lowest member of the base should be painted a dark color, or black.

SMALL HOUSES

Other fruitful sources of trouble and expense are the flashings and the rain-water gutters with their leaders. These latter may often be dispensed with entirely without inconvenience, especially in houses which have no cellar. In former times they were seldom used. Even when required in certain places, they may be left off other places. Galvanized steel as now commonly made and used, for gutters, leaders, and flashing, is a most unsuitable material, for it quickly rusts. Constant painting may preserve gutters, but the inside of leaders and flashing rusts, even if the outside is painted. Tin also is bad; and the same may be said of any other sheet metal which requires paint to preserve it. It is much more economical to pay more for material which does not require painting, and often the difference in cost may easily be made up by omitting gutters from places where they are not necessary. (For remarks on gutters and leaders of fibrous material, see Part XV.)

Most of the recommendations here made for eliminating repairs not only involve no extra cost but, on the contrary, should reduce cost; the saving being effected by simplifying the construction and leaving out useless parts. After that process has been carried as far as possible there will still remain, however, a great deal which involves expense for its maintenance. Interior wall-covering is a heavy item of that kind. Papered walls are generally less expensive to keep in order than painted ones, as the patterns on the paper conceal slight blemishes. Where paint is used inside the house it is wise to cover it with the very best quality of enamel, as that material, in spite of its cost, is much less expensive in the long run than any other kind of paint. The woodwork of rooms in my own

house which was treated with enamel more than twenty years ago looks now almost as good as new, while other woodwork, not enamelled, has been repainted several times, involving much greater cost.

Plate 19

These two designs represent houses of a very economical type, yet there is a considerable difference between them in this respect. Both are square in plan, which is the most economical form there is; they each contain five rooms, a bath, and scullery. They would be suitable for people who, despairing of any settlement of the servant problem, have determined to do their own housework and want as little of it as possible. The scullery is an important feature of these plans because, relieving the kitchen of all the dirty work, it makes it more suitable as a place to eat in and as a substitute for a dining-room.

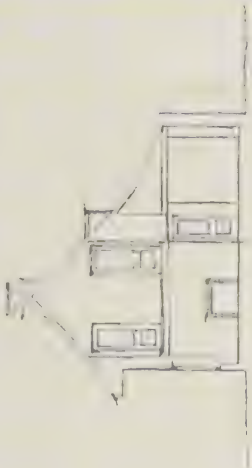
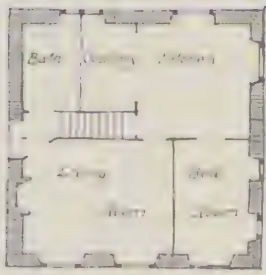
Notwithstanding that these two houses have almost the same plan and contain practically the same amount of room, yet House *A* would probably cost considerably more than House *B*, for, above the ground story, it requires much more masonry than House *B*. These houses present, therefore, a good illustration of how great a difference there may be in the cost of carrying out two designs having similar plans, the same kind of construction, and affording the same accommodations. Neither house is supposed to have a cellar, and each will be provided with ample storage space in a little out-building off the kitchen. The heating is to be done by heaters of the Baltimore type.

Table of Modules

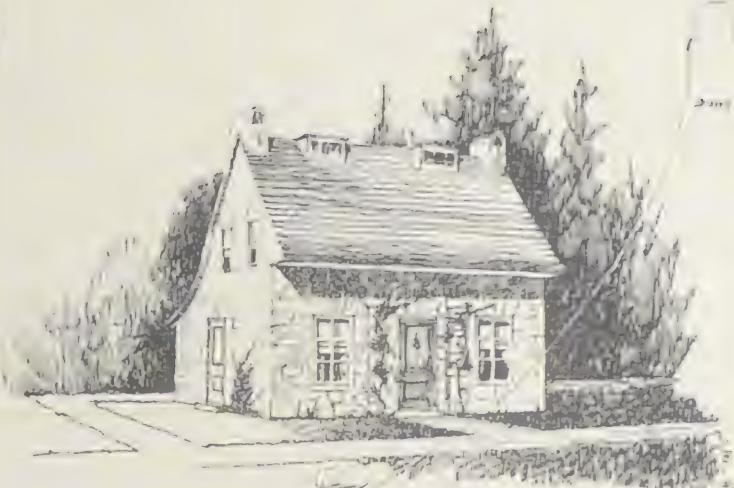
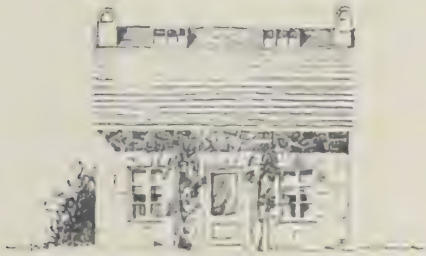
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- 3 " - 11'-3"
- 4 " - 15'-0"
- 5 " - 18'-9"
- 6 " - 22'-6"
- 7 " - 26'-3"
- 8 " - 30'-0"
- 9 " - 33'-9"
- 10 " - 37'-6"
- 11 " - 41'-3"
- 12 " - 45'-0"
- 13 " - 48'-9"
- 14 " - 52'-6"
- 15 " - 56'-3"



HOUSE B



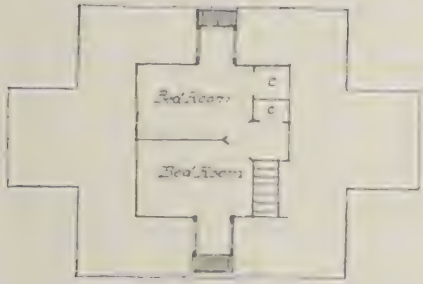
Section of House A



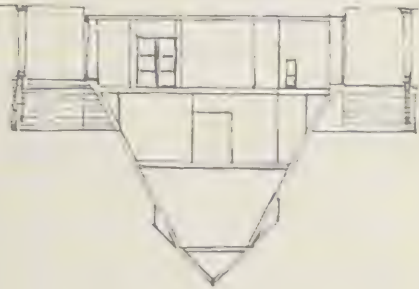
Section of House A



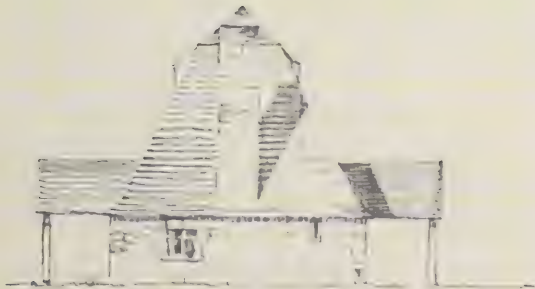
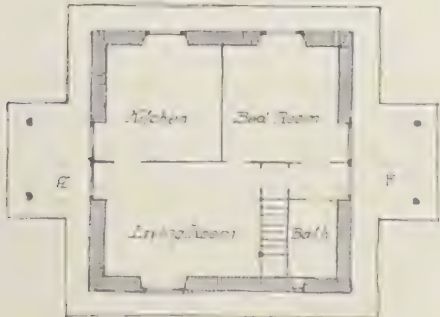
Section of House A



HOUSE A.



Plan of upper floor



PROPORTION

PROPORTION in design is harmony of dimensions and an essential element of good design, which requires an agreeable relationship of dimensions, both as to the whole and every subordinate part of the thing designed.

The proper proportions for many objects are determined in various ways; nature does it for practically the whole animal and vegetable kingdoms. The proportions of another large class of objects are fixed by the stature of man, such, for instance, as the steps of a staircase, balustrades, furniture, and utensils of all kinds. The ancient Greeks determined the proportions for the orders of architecture, and so justly that any considerable departure from them produces the same disagreeable effect on the trained eye as does a departure from nature's proportions in animal life. Stability governs, to a certain extent, the proportions of another class of objects, such as chimneys and towers; and those of many more are gauged in other ways.

But outside of all these there lies a vast field in which no generally accepted standards of proportion exist, and where the designer must, to a great extent, depend on his own taste and judgment. In such cases the only governing considerations are that the proportions be fitting or reasonable, agreeable to the eye, and in conformity with the requirements of unity and the other laws of good design. Proportion in building comes under this head. There are no recognized rules for determining the proper relationship which should exist either between the height, breadth, and depth of buildings or the rooms they contain; these are matters of taste and judgment.

The small house is, however, more influenced in its proportions by the stature of man than any other class of buildings. In general the dimensions of its various features, such as doors, windows, story-heights, rooms, etc., are not greater than convenience of use requires. It would seem, therefore, that the proportions of such houses should be most agreeable; but as commonly built in the United States that does not happen. Indeed, the builders of small houses in this country, for many years past, have labored under an almost insuperable handicap in this respect, for, under present conditions, there is a constant conflict between the requirements of utility on the one hand and beauty on the other. Utility requires rooms to be of reasonable height and properly lighted. Beauty demands that the house be well proportioned and not ungainly in appearance; but as usually designed, it is next to impossible to reconcile these two requirements. If the rooms of the small two-story house be made of proper proportions, the house will be too high for its other dimensions, and if the house is made low enough to look well, the rooms will not conform to modern ideas of comfort.

In former times, when comfort was not so much considered, builders placed the upper story mostly in the roof, where there was insufficient headroom, poor light and intolerable heat in warm weather. Many of these houses were extremely good-looking and are the envy of the modern designer, who resorts to all sorts of expedients in the vain attempt to obtain similar results without conforming to similar proportions. He takes upon himself the task of trying to make two full stories appear to be one and a half. A common expedient in this endeavor is to swell the dormers out of all proportion to their proper selves, and to such an extent is this done, in some cases, that practically the entire floor is contained in

them; but the trick is always perfectly apparent and the result uniformly bad. Another common expedient is to use a mansard or gambrel roof with steep slopes at the sides; but besides being ugly, the scheme is wasteful and the accommodations bad. It is wasteful, because the sloping sides of the roof require furring on the inside in order to obtain any vertical wall surface; the space thus furred off is wasted and a double enclosure made necessary. The accommodations are bad, because the rooms are insufferably hot in warm weather. The sun heats the confined air in the furred-off spaces, so that, besides the usual superheated air-chamber in the triangular space under the roof, the sides of the rooms are also in like manner heated, and in summer act as radiators of heat.

All contrivances or expedients for reducing the apparent height of the house without actually doing so are, in their very nature, vain deceptions and cannot be satisfactory.

Attention has already been called to the fact that the introduction of the ridge-dormer opens up a new and promising field to the designer of small houses, for it removes from his path what is now his greatest stumbling-block—this matter of height. The use of the ridge-dormer renders unnecessary all expedients for reducing the apparent height of the house, because it makes possible a real reduction, and this without sacrifice; indeed, it does more, for by its use the floor under the roof, usually the hottest, becomes the coolest, pleasantest, and most desirable part of the house. In summer it insures the escape of all air in the building warmer than the outer air, and in winter makes the rooms cheerful and bright. It therefore reduces the cost while improving the quality of the house both as a place to live in and an object to look at.

Although, as has been said, there exist no generally accepted rules for determining the relationship which should exist between dimensions in buildings, that is, as to height, breadth, and length of the structures themselves, or the apartments therein, yet we do know that there exists a pleasant relationship between the dimensions of certain figures as, for instance, a square, a square and a half, two squares, and many other geometric forms. Also that 2 to 3, 3 to 4 or 5, 4 to 5, 6, or 7, and other combinations of dimensions produce agreeable results. It therefore seems evident that if in design such pleasant combinations only are used, the results ought to be better than if dependence is placed on chance. The module system of planning as employed in these designs makes it easy to do so, and, if properly used, it is reasonable to suppose that the proportions should be better and more harmonious than if the eye alone is relied on as a guide.

It is impossible to overestimate the importance of proportion in architectural design. While it would not be correct to say that good proportion is everything in architecture, one may say that without it all else is of little worth. With good proportions a hut may be a work of art, and without them the most pretentious structure cannot please.

It is simply astonishing what a difference even a slight change in proportion may make in the character of a design. With certain proportions, an architectural feature may have a grand air of majestic dignity, which immediately disappears when one of its dimensions is slightly altered.

It follows, therefore, that the most economical way to impart an agreeable appearance to a building, or other work of architecture,

Houses for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

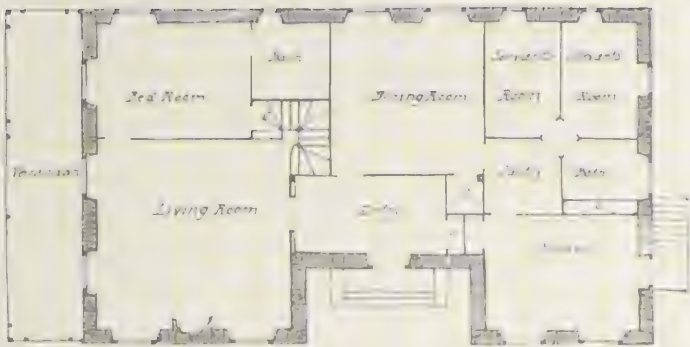
No. 20

Table of Modules

- 1 m = 3'-9"
- 2 " = 7'-6"
- 3 " = 11'-3"
- 4 " = 15'-0"
- 5 " = 18'-9"
- 6 " = 22'-6"
- 7 " = 26'-3"
- 8 " = 30'-0"
- 9 " = 33'-9"
- 10 " = 37'-6"
- 11 " = 41'-3"
- 12 " = 45'-0"
- 13 " = 48'-9"
- 14 " = 52'-6"
- 15 " = 56'-3"



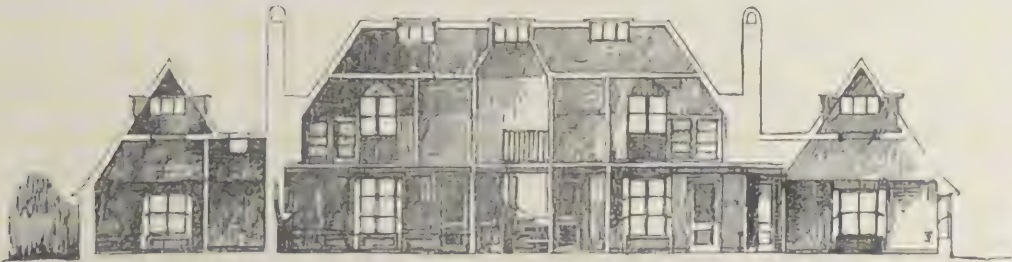
Plan of Upper Floor



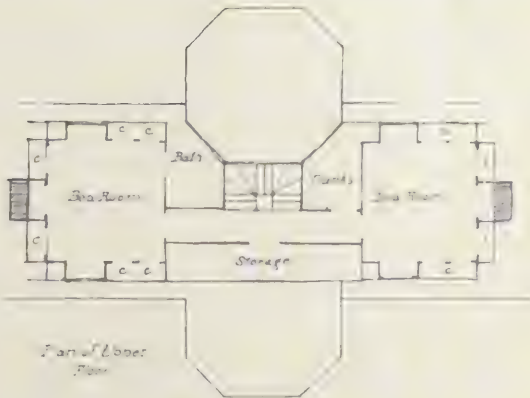
HOUSE A



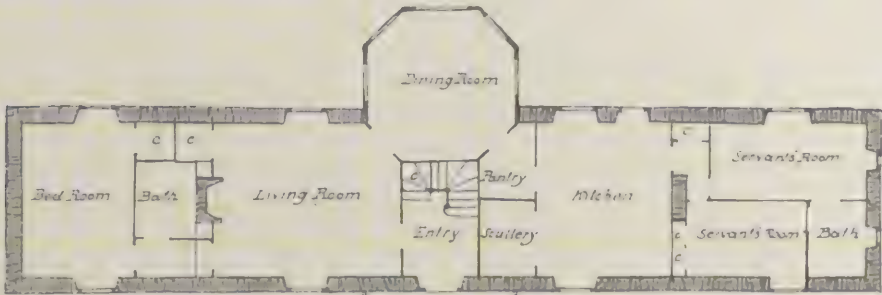
HOUSE B



Section on line A-B of plan



Plan of Lower Floor



Porch



SMALL HOUSES

is to endow it with agreeable proportions; for if it has these it will be good-looking, no matter how plain it may be in other respects, and without them no amount of elaboration or applied ornament can make it a work of art. It will be seen, therefore, how immensely important is any feature or device which tends to make it easier to procure good proportions in small houses, for they constitute the most numerous class of buildings, and the one having the most intimate relationship with the lives of the people.

Plate 20

Here are two designs of very different types, but the houses are nearly of the same size, House *A* being slightly larger; the difference lies mostly in the living-room and entry. Each house has three masters' bedrooms, two servants' bedrooms, and three bathrooms. In both houses the servants' bedrooms are on the ground floor, and there is a liberal supply of closets.

House *A* has its staircase arranged in a peculiar way which might not be liked by some, starting as it does from a corner of the living-room; but this might easily be changed if desired, for there would be little trouble in making it start from the hall or entry.

House *B* belongs to a type elsewhere represented, the plan being similar in form to that of Plate 40 and House *B* of Plate 45. The distinctive difference lies in the dining-room. Here it is octagonal, projects beyond the general line of the building, and assumes the form of a large bay window. It would be a very bright and interesting room. As planned, there is no entrance to it except from the living-room and pantry. In actual use this would prove sufficient, though some may think there should be a door from the entry; which could be contrived if the floor of the room were lowered by two steps to obtain headroom under the stairs. The arrangement of the ridge dormers in the end pavilion is unusual, though employed in one or two other cases.

TRIM, CASING, AND DOORS

THE solid plaster partitions used in these houses, which are made by simply hanging a jute scrim or net and plastering both sides of it, render unnecessary the wooden studs and laths commonly used in making partitions. This method not only saves the cost of all those materials, their erection and maintenance, but permits of several other economies, an important one being the elimination of most of the ordinary trim or casing. The usual way of making a doorway is to construct a frame around the opening, called a door-buck, and after the plastering is finished cover the buck with a casing. The true frame is thus covered up, and the architrave which one sees about the doorway is a sham.

In designing these houses the object has been to save the cost of all such shams and counterfeits; therefore, no casing is used, but the frame is made sufficiently presentable to form the necessary finish about the opening, the result being that more than two-thirds of the lumber and labor is saved, and the appearance of the doorway greatly improved. There is nothing new about this, but simply an adoption of old methods, for originally doorways were undoubtedly thus constructed. The exact difference in the two systems may be seen by referring to the detail drawings on Plate 21; Figures 1 and 2 are both drawn to the same scale. Figure 1 represents the usual form of construction, and Figure 2 this new way; which is in fact, as has been said, a very old way, being a return to first principles and natural reasonable and sound ways of building.

Straightforward methods of construction generally produce the best results, and this is no exception to the rule. Doorways thus made have about them an air of elegance and refinement seldom found in ordinary work of this class.

The same principle is used in the construction of the surbase. The ordinary way of making such bases is to cover up the real base by nailing boards against it, and planting mouldings on top of them to relieve their too great projection (see Figure 4, which be it observed is drawn to the same scale as Figures 3 and 8). By the method here described practically all that material and labor is saved, for the real construction is exposed and the cost of hiding it and embellishing the covering with mouldings avoided. The method of constructing the base is this: A piece of dressed lumber, of at least the thickness of the proposed partition and the height of the base, is laid on the floor in the proper place. This piece of stuff forms the finished base on both sides of the partition. The jute scrim is then hung plumb above and fastened to it. After the plastering is finished, nothing needs be done to the base except to clean it.

Any one who has built knows what a long and tedious operation lies ahead of him after the plastering. The house is then only half completed, for the greater part of the carpentry work remains to be done, trim must be applied to the door-jambs, the doors fitted and hung, window-casing set, sashes hung, and bases with their mouldings installed. By the method here described, when the plastering is done the house is practically finished, for nearly all that work is eliminated.

The hanging of a door under ordinary circumstances is quite an operation, and consumes a great deal of time, for each opening, being cased in with its sham architrave, is bound to differ somewhat from the others, and each door must be separately adjusted. If made as here described, no such adjustment is necessary. The

frames are put together in the shop of a size to correspond to the doors, and the hardware applied. If the frames are set plumb, nothing remains to be done to them at the building but to place the doors on their hinges, which is the work of a moment. By this means a vast amount of useless material and labor is saved, a great deal of time gained, and better results secured (compare Figures 1 and 2, both at the same scale).

Nor is it only in doorways and bases that useless materials are dispensed with. The same methods apply to windows and all other places where casing is commonly used. Instead of building window-boxes after the usual fashion, then covering them with false architraves, the frame itself is moulded to adjust it to the sash, and all casing about it, whether inside or outside, dispensed with.

By these means most of the ordinary woodwork of the house



No. 28

Rabbeted door. Driven hinges. Solid plaster partitions. Beam ceiling. Tile fireplace with plastered sides and wooden shelf.

is omitted and the cost of all that material saved, also the cost of its installation, painting, and upkeep; besides which a great amount of inflammable matter is excluded from the building.

With the thin partitions and narrow door-jambs it is very convenient to use doors of the continental kind, which have the rabbet on the door itself instead of on the jamb (see Figure 7 on the plate). Such doors are used almost universally throughout central Europe, and have several advantages over the sort used here and in England; they are easier to hang, and the hardware for them costs less and is better-looking; but this is a matter more fully explained under "Hardware." So far as the doors themselves are concerned, there is nothing peculiar about them except the rabbet and moulded edges, which can be run on any door (see Photograph 28).

When rabbeted doors are used the door-frames need be no thicker than the plaster partitions, *i. e.*, $1\frac{3}{4}$ ", as shown in Figures 6 and 7; but if the rabbet is on the jamb, it is more convenient to use slightly thicker stuff, as shown in Figure 5. When that is done, eyelet hinges may be used (see detail Plate 36) or hook-and-eye

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hinges, as illustrated in Figures 5, 9, and 10, and more fully described under "Hardware."

Any kind of door may be used, but the writer greatly prefers the French kind shown in Figures 5 and 9. The peculiarity is that the mouldings are solid and serve for both sides of the door, whereas in our doors they are fitted to each side separately. The French method is more logical, more economical, more speedy, takes less wood, less labor, eliminates nails, and makes a more substantial and better job; besides which, it generally results in a handsomer door.

Plate 21

This little house is very compact and conveniently arranged, characteristics seldom found with a picturesque exterior, but this

one is not lacking in that respect. The external outlines are sufficiently interesting and varied. Moreover, the several departments are well segregated. The service section is entirely contained in the low wing at one side. The ground floor of the main body of the house is occupied by the living-room and dining-room. The stairs are placed in a little turret at one side of the entry, and the upper floor contains three masters' bedrooms and a bathroom. There is a liberal supply of closets, and the space required for communication is reduced to a minimum.

The building is intended to have no cellar; in lieu of which the kitchen wing will be extended as far as necessary to provide the most ample storage accommodations. It might well be doubled in length and still cost not one-half of what can be saved by omitting the cellar.

Table of Modules

1 m	= 3'-9"
2 "	= 7'-6"
3 "	= 11'-3"
4 "	= 15'-0"
5 "	= 18'-9"
6 "	= 22'-6"
7 "	= 26'-3"
8 "	= 30'-0"
9 "	= 33'-9"
10 "	= 37'-6"
11 "	= 41'-3"
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13 "	= 48'-9"
14 "	= 52'-6"
15 "	= 56'-3"

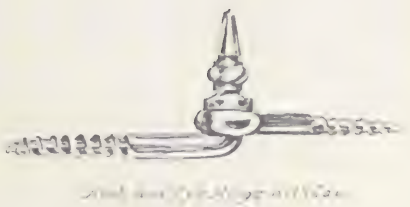
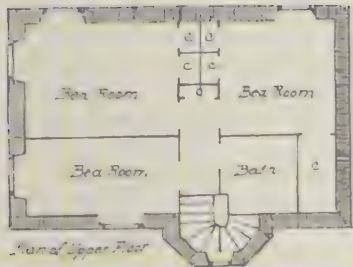
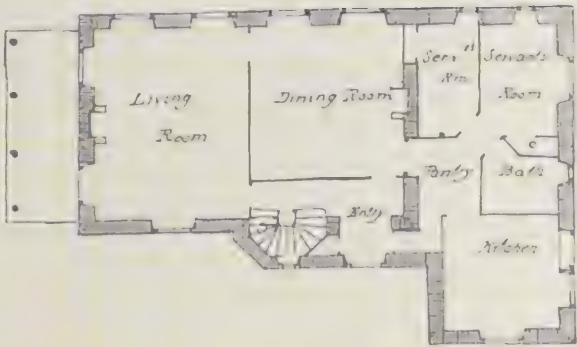


Fig. 3

Fig. 4

Scale: 1 Part = 1 Inch

BASE of
Ordinary Stud
and Lath Partition

Base used in
these houses

Fig. 4 is a section
through an ordi-
nary stud and
lath partition
contrasted with
Fig. 3, which
represents a
corresponding
section through
a base of the
kind used in
these houses. Both
sections are at
the same scale.



Fig. 5

Enlargement of Part of Fig. 5. Scale: 3 Parts = 1 Inch

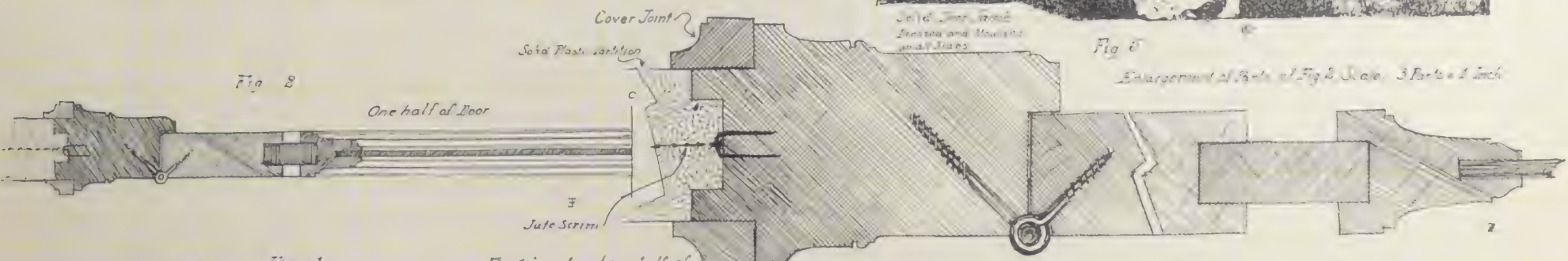


Fig. 2

One half of Door

Cover Joint
Solid Plaster Partition
Jute Scrim

Fig. 1

Fig. 1 is a plan of one half of
an ordinary door and its jamb
in contrast with Fig. 2, which
represents corresponding
parts of the kind of doorways
used in these houses. Both plans
are at the same scale: 1 part
= 1 inch

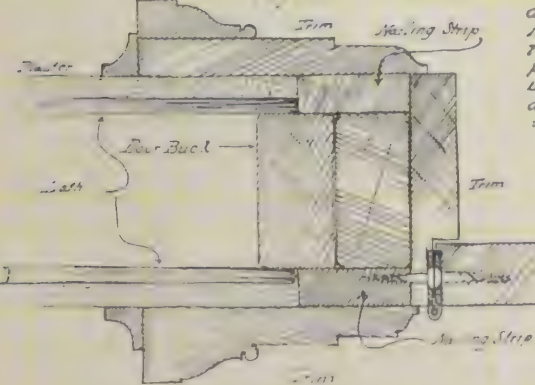


Fig. 6

Fig. 8



Figures 6, 7 and 8 represent the Frames
Doors and Bases used in the less
important parts of the houses
Scale: 1 Part = 1 inch

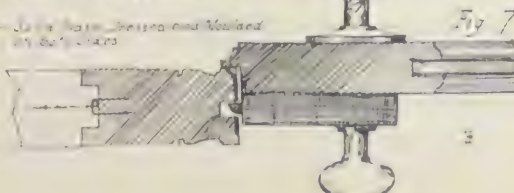


Fig. 7

COURTS

UNDER the head of "Gardens" the writer has endeavored to show that the usual way of placing houses in the United States, in rural and suburban districts, by setting them near the center of the plot, is not the only one which deserves consideration—especially for houses of the humbler sort—and that in many cases much might be gained by adopting the European custom of placing them directly on the line of the road. For houses of a more pretentious kind there is still another plan worthy of consideration though seldom used in this country; that is, to set the house back from the road, enclose the space between it and the road by walls or outbuildings, and thus form an entrance-court, upon which the public side of the house shall face.

Such courts not only give an air of distinction to the house but serve to secure the greatest possible privacy for the family. When outbuildings, such as stables, garages, kitchens, laundries, and servants' quarters, are placed along the sides of the court, as they often are in France, the garden, or private side of the house, is relieved of all features which might by their presence interfere with its legitimate use as the outdoor home of the family.

This arrangement of dependencies puts them where they can be most easily reached by tradespeople and servants without invading the sacred precincts of the garden, and where they can be used with the most effect as a part of the architectural composition. Dependencies, properly placed in this way, are so far from detracting from the fine appearance of the building, as those unfamiliar with the plan might suppose, that one may safely say there is no other plan which gives so distinguished an appearance to the house. The entrance-court does for the house what the anteroom does for the *salon*—stamps it as a place of consequence. The French plan as here described, that is to say, the forecourt separated from the road by a wall or grille, pierced only by the great entrance, and bounded on the sides by dependencies of the mansion, with the house occupying the fourth side, facing one way toward the court and the other toward the garden, is probably the most aristocratic type of plan ever devised. It was the one used by the ancient French nobility, both for their city and country houses, since the time of Henry IV. The nobility seem to have adopted this arrangement from that of the royal palaces, where it was sometimes applied on a scale of stupendous magnificence.

Such a plan may not be very well suited to a democracy. There is certainly nothing democratic about it. The key-note is well-guarded seclusion. In the many fine examples of it which still exist in Paris, the house can rarely be seen from the street, and there is nothing to indicate its presence but the high stone wall and monumental entrance to the court, with its fast-closed doors.

The plan, however, has many admirable features and may be used without that air of aloofness from the vulgar herd which characterizes the abode of the French patrician. For people who value privacy there is no plan like it, but it is one which cannot be used on a very modest scale. The courtyard must be large enough for

vehicles to turn in, and that requirement serves to fix a minimum for the other dimensions.

In this country, people seem to have a great prejudice against having a stable closely connected with the house; perhaps that prejudice is due somewhat to our way of caring for stables. The writer once remarked to a Frenchman that the custom of having the stable either in, or attached to the house, as is so common in France, would not do here on account of the smell. He replied that it was not the stable which smelt but the dirt. Garages have now largely replaced stables, and there seems no reason why they should not be more intimately connected with the house than stables have been.

The entrance-courtyard is not, of course, peculiar to France, but is often used in most European countries for houses of the better class and in a great variety of ways. Several of the designs of this series are provided with them, and wherever used they impart to the house something of that distinction which so strongly characterizes the French model.

Plate 22

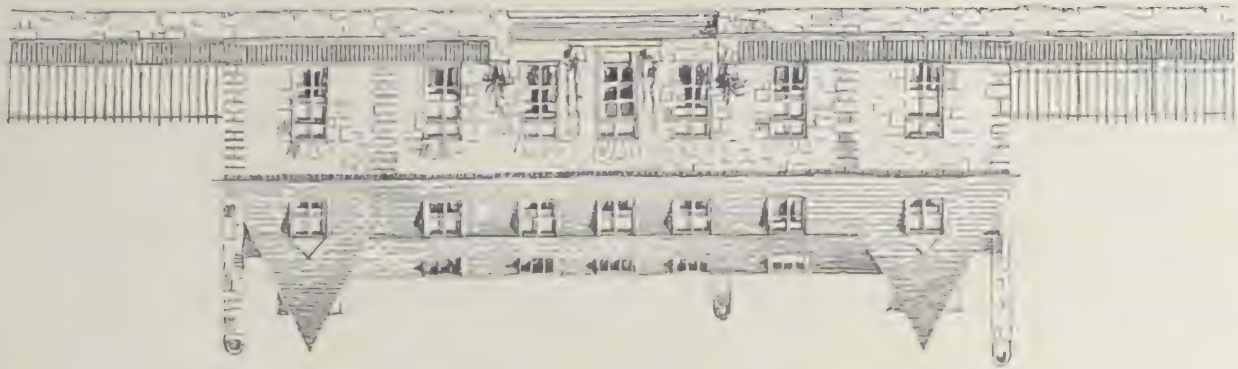
This design illustrates the above-described plan in all its essential features, and on about as small a scale as can be advantageously used; but, even reduced in this way, the house still becomes larger than any other one of this series. It provides for seven masters' bedrooms as against four or five at most in the other designs. It also has a boudoir on the upper floor and a reception-room on the ground floor, which the other plans do not have. The details of construction and the architectural treatment, however, are of the same simple type as used in the other designs. The entrance-court is flanked on either side by low wings, one containing the garage and the other the servants' quarters and kitchen. Each wing has its own service court, reached through a covered passage from the main courtyard, after the usual French fashion. The entrance to the house is near a corner of the court—a place which generally strikes the English-speaking person as a rather undignified location, but practically it is the best, for any other would greatly damage the plan. This arrangement of the entrance gives the living-room an outlook both on court and garden. The rooms on the garden side open upon the terrace, which, as usual in France, extends the full length of this side of the house, affording a pleasant promenade and an agreeable place to eat when the weather permits. Following the French plan of using staircases rather than corridors, two of the bedrooms on the upper floor, on the dining-room side of the house, are reached from the staircase at the entry; while the three other bedrooms and boudoir depend on the staircase in the turret at the opposite angle of the court. The whole arrangement is typically French. In Paris this plan is used with many variations, but the essential features are always present, viz., the court bordered on one or both sides by the dependencies, and the house standing between court and garden.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

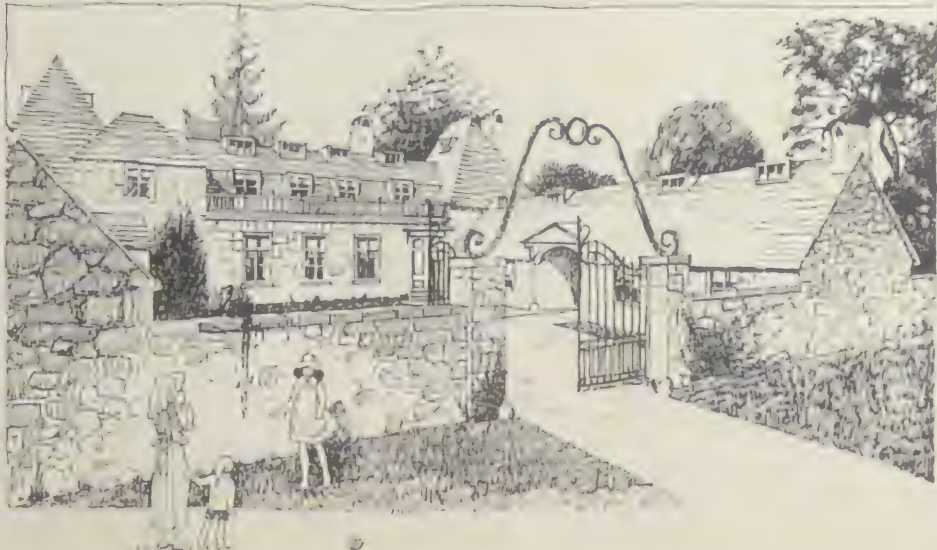
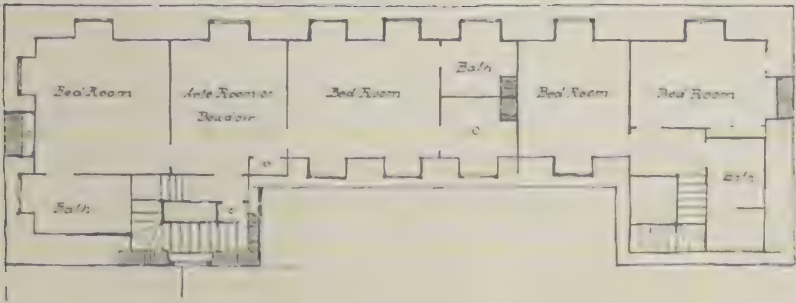
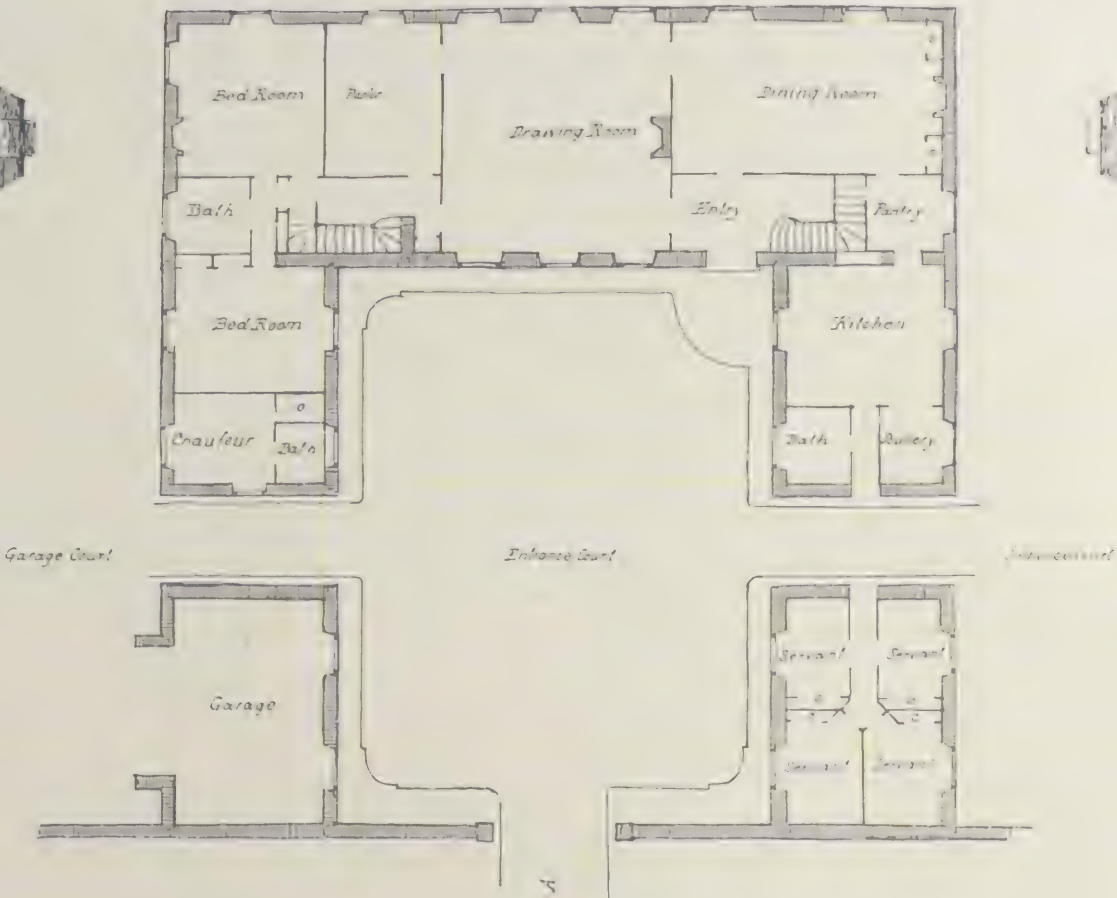
No. 22

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



Section on line A-B of plan



SCALE

SIZE is relative. For us things are large or small in proportion as they exceed or fall short of our own bulk. The natural scale for man, therefore, is man himself; and one may say that scale in architecture is the ratio which exists between the apparent size of the construction in all its parts and the stature of man.

If the building appears to be designed so that it might almost be used by beings larger than man, we say the scale is large. The object in using a large scale is to produce grandeur by impressing the imagination and exciting awe. If the scale is small, a contrary effect is obtained, and an appearance of pettiness may result—as if the building were intended for pigmies or dolls. A large scale is generally adopted for public buildings and monumental constructions, while for reasons of economy the smallest practicable scale is used for ordinary habitations of the humbler sort.

A large scale involves great cost. It is therefore desirable that the effect thereof should correspond to the outlay; whether that happens or not depends largely on the skill of the designer. It might be supposed by one unacquainted with the subject that whatever scale is adopted should be adhered to throughout; but if that were done, there would be nothing to assist the eye in grasping the true size, and the effect intended to be produced by the large scale would in great measure be lost. Two scales must, therefore, be used—one being the scale of man to assist the eye and serve as a key or measure, so to speak, of the general scale. In designing a construction, therefore, when a large scale is used, there should be, as often as practicable, features which serve as reminders of the actual size of man. This necessary information may be furnished by objects which are generally associated with the stature of man, such as balustrades, steps, doors and windows of ordinary size, statues and other features commonly proportioned to the size of man.

Much of the impressiveness of many monumental buildings is lost by a disregard of this principle, the most extraordinary case being the church of St. Peter's at Rome, where that very unskilful architect Moderna has succeeded in robbing the building, in appearance, of at least half of its true dimensions. One can understand why it might be desired to make the most of a colossal outlay, but how can an apparent effort on the part of the architect to belittle his work be explained except on the assumption of folly or ignorance? At St. Peter's it seems as if all the skill which the designer possessed had been used to detract from the grandeur of the edifice. By rigidly adhering to a gigantic scale throughout, the key scale is destroyed; by making balustrades, niches and statues of colossal proportions the imagination has no guide, or rather the usual guide is falsified and the eye completely deceived, so that the great order, which is actually 108' high, appears to be not more than half that much. The belittling effect is still further accentuated by the expanding lines of the straight parts of the lateral colonnades of the approach, which produce a kind of false perspective, leading one to suppose himself close to the building when in reality he is a great way off; but for this Moderna was not responsible. The same system of deception is also used in the interior, where the figures of the spandrels if stood up would be 20' high, and cupids appearing only slightly more than life-size 8' or 10' high. In these and other ways a dwarfing effect is produced, and no amount of

study can enable one to grasp the true dimensions and fully realize the proper magnitude of the vast edifice.

As in this case the effect of scale has been to diminish the apparent size of the building, so in many other buildings this principle has been used to increase apparent size. A multiplicity of parts generally has that effect, and it is for this reason that a Gothic church usually seems much larger than a Renaissance one of equal size, where the parts are fewer.

It is marvellous what may be done by a skilful designer in adding to the grandeur of his work by the judicious use of scale, and this, too, without resorting to tricks; but tricks have often been used to magnify scale. Apparent size may be increased in this way by making the key scale, that is, the features intended to show the size of man, and by which the eye instinctively gages the other dimensions, somewhat under normal, and also by the use of false perspective. There are many curious examples of false perspective, as in the Cathedral of Poitiers and in the great staircase of the Vatican; but this practice has the inconvenience that it can only operate from one point of view, and while the interior may look larger than it really is from one standpoint, it will appear correspondingly smaller from another. The expedient is unworthy of monumental architecture. There are places, however, where it may legitimately be used. One of that kind is the curious little theater of Palladio at Vicenza, where the scene is constructed in artificial perspective. Three streets apparently of considerable length radiate from the stage, but as one advances up one of them, he is surprised to find the buildings which from the auditorium appear to be of normal size soon become only waist-high.

Interesting examples of how a diminutive scale may increase apparent size can be seen in some of the old Colonial buildings at Annapolis, which from the exterior seem much larger than they really are. This is done by making the windows smaller than normal, so that from the exterior one takes them to be 3' wide or more, and gages the other dimensions accordingly, but upon entering finds them not much over 2' wide. In this case the eye estimates the size of the building by the windows, and what looks like a mansion of considerable dimensions is in reality a house of very modest proportions.

A sacrifice of one of the three dimensions enhances the other two. The narrowness of the Gothic nave adds to its apparent height and length. The lower the ceiling, the greater the apparent length and width. This principle has an important bearing on the designing of small houses. If the house is small, it is desirable that the rooms should appear as large as possible, and they will appear much larger than otherwise if their ceilings are low. The low ceilings, too, will reduce the height of the house and in most cases improve its appearance while lessening its cost. The enlarging effect of a reduction in ceiling height needs to be seen to be realized. The room in which I write this is 20' long, 18' wide, and 10' high. Over it on the floor above is another of precisely the same horizontal dimensions, but the ceiling is 1' lower, and the room appears considerably larger on that account, as may be seen by the photographs. The contrast is so striking that I could hardly believe there was no difference in the horizontal dimensions until I had carefully measured them.

SMALL HOUSES

Plate 23

This design was suggested by my boyhood recollection of an old house which, many years ago, stood on Water Street, New Haven; but I feel it does scant justice to the original, which was demolished when I was only about ten years old. Even at that early age the house made a great impression on me, and to see it was always a joy. Not far from it stood the Benedict Arnold house, a veritable architectural gem, but that and many other beautiful specimens of Colonial architecture, in which New Haven was, at one time, richer than any other New England town, have been ruthlessly destroyed.

In the present design one of the outbuildings serves as a garage and the other as a guest-house. The central body contains, on the ground floor, the living-room, dining-room, pantry, kitchen, and one master's bedroom having a private bath. On the first floor there are four more bedrooms and a bath. Above this a roof story has two servants' rooms and a bath. There is also a bedroom and bath in the guest-house.

This house with its outbuildings has an imposing appearance, but it is not so big as it looks. The house proper is not larger than some others of these houses, but the wings add importance to it. The plan is economical, there being very little waste space.



No. 29

Room at 111 East 40th Street, New York. Ceiling one foot higher than the room of Photo No. 30. All other dimensions are the same in both rooms.

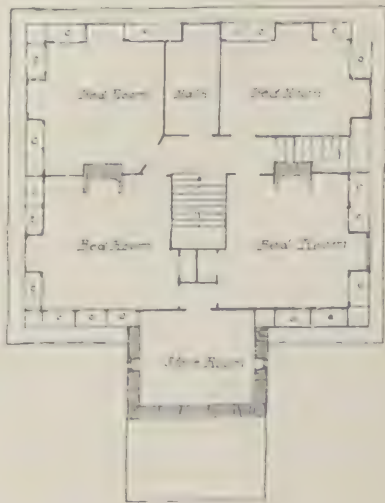
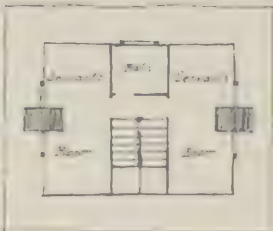
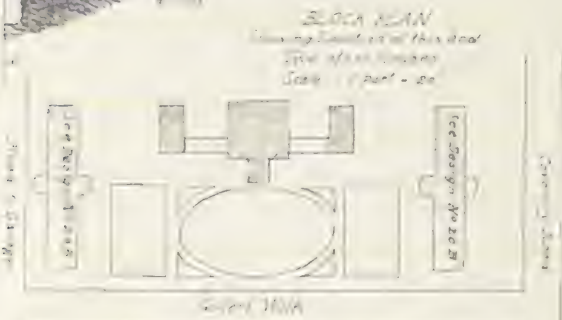
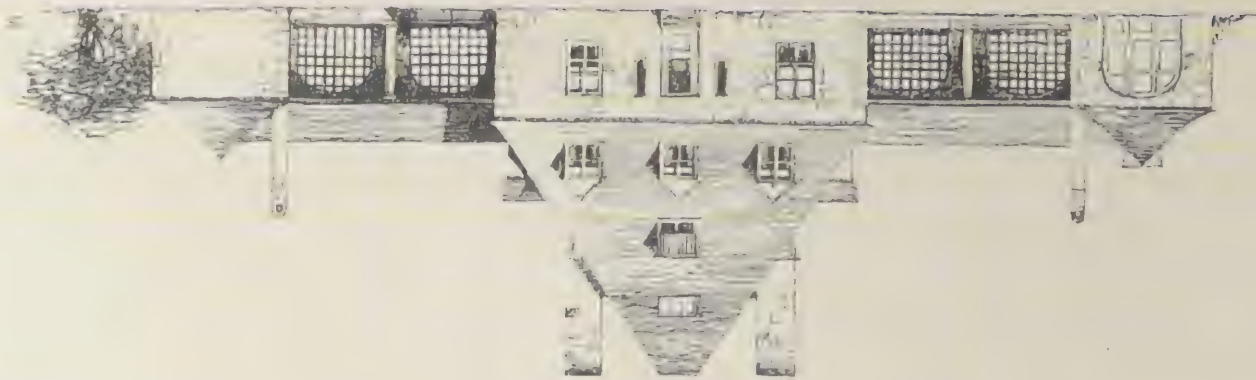


No. 30

Room at 111 East 40th Street, New York, immediately over the one shown in Photo No. 29.

Table of Modules

1	m	-	3'-9"
2	-	7'-6"	
3	-	11'-3"	
4	-	15'	
5	-	18'-9"	
6	-	22'-6"	
7	-	26'-3"	
8	-	30'	
9	-	33'-9"	
10	-	37'-6"	
11	-	41'-3"	
12	-	45'	
13	-	48'-9"	
14	-	52'-6"	
15	-	56'-3"	



CONCRETE

CONCRETE plays an important part in this method of building. In ordinary walls the face-stones are backed with it, as explained in Part VI on Mosaic Rubble, and cellar, foundation, and many other walls, which are not exposed to view, are made entirely of concrete. It is therefore highly desirable that the material should be made and used with economy. A great deal may be saved by a liberal use of large stones embedded in the concrete, and this is here done to the greatest practicable extent, about 40 per cent of the entire mass (see Figure 3 of Plate 18).

The strength of concrete depends largely on the thoroughness of the mixture, and to make the best kind a machine for mixing is necessary, as are also the best cement and cleanest sand.

Under such conditions, for work of the class referred to, the mixture should be 1 part cement, 4 parts sand, and 8 parts broken stone.

If this is mixed well and made of the proper consistency, it will run and easily find its way around the large stones, consolidating them all together into one homogeneous mass. If properly used, the large stones detract nothing from the strength of the concrete; but even if they did, it would still be many times stronger than required for these houses. The concrete should be put in by shovel, not poured, for when poured the stones separate from the fine part.

The specification of broken stone of a uniform size is a mistake. It is better to take it just as it comes from the crusher, because the fine particles and chips help fill voids, make the concrete more dense, and permit of a larger percentage of stone. Also, when used in the way here recommended, it is best to have the broken stone rather small, not more than $1\frac{1}{2}$ " for the larger pieces.

One bag of cement with four times that quantity of sand (dry measure) and twice as much stone as sand make 9.6 cubic feet of concrete in place; or with 40 per cent large stones, 16 cubic feet. As there are four bags of cement to the barrel, each barrel makes 64 cubic feet of masonry of a superior kind.

For concrete floors the writer has found that the most economical procedure is to spread the whole area to be concreted with broken stones pounded into the ground and to cover them either with concrete of the kind above described, or with other fine stones on which is spread Portland-cement mortar, which permeates the whole mass when worked, and that a great deal of time and money may be saved by completing the process in one operation (see Photograph 31). The usual method is to spread the concrete on the earth, then finish off afterwards with $\frac{1}{2}$ " of fine stuff, but if the concrete is mixed right, no such double process is necessary. It can be finished perfectly as it is put in. Where a very fine finish is not necessary, as, for instance, concrete surfaces which are to be covered by wooden floors, a smoothing-iron at the end of a long handle, such as is used in asphalt work, is very convenient and speedy for finishing. A tool of this sort is used in preparing the excellent concrete bases for pavements in the city of Liverpool, England. Where a more perfect finish is required, the cement should be worked with a trowel, and it will be found that if the mixture is right, when the trowel is applied, sufficient fine stuff will come to the surface to allow of a finish of any degree of perfection; but the success of these methods depends on the thoroughness of the mixture of the concrete and the just quantities and good quality of the several ingredients.

Concrete finished this way—in one operation—is superior to that

of the double process. When a finishing coat of mortar is applied to concrete in the usual way, there is danger that the adhesion between the two will not be perfect, and especially so if any considerable time lapses between the laying of the concrete and the application of the finishing-coat. If the concrete surface is dirty, or if it has had time to become oxidized from the air, the finishing-coat will not stick to it, and there will be no perfect bond between the two; in which case the surface will not stand rough usage.

New cement will not stick to old cement unless the oxidized surface of the latter is removed, and it is surprising to find how few, even among the workers in concrete, understand this fact. Most of them seem to think that wetting is a sufficient preparation, or at most an occasional chipping of the old surface, and many failures result from this cause.



No. 31

Making a floor of broken stones and cement

A great deal of concrete is wasted in most building operations by applying it directly to the ground. Of course it is impossible to cement anything to the earth. Walls should be started by laying up at least the first foot dry, using as large stones as possible, and filling the voids with smaller pieces. Then when the concrete is applied, the fine stuff in it will find its way down and cement the whole mass together. This procedure detracts nothing from the strength of the work and saves a great deal of cement.

A careful observance of the directions here given will prove a considerable item of economy in building over common methods.

Plate 24

This design was suggested by a description, read long ago, of a certain type of Russian house. Immediately upon entering, on the ground floor, a broad staircase presents itself, about the top of which are grouped the finest rooms of the mansion. In a humble way this design conforms to that idea.

The site for the house is directly at the side of the road on rising land. One enters at the road-level. Beyond the entry, and of equal width, a flight of steps leads to the floor above. As one ascends these

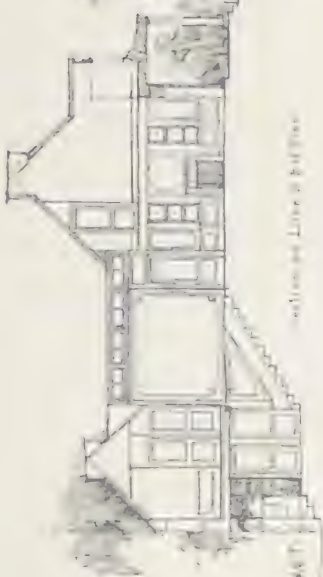
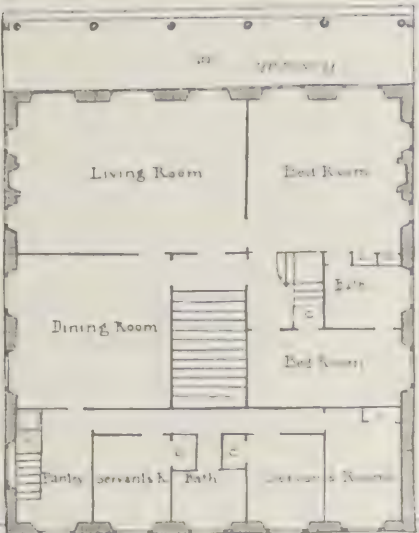
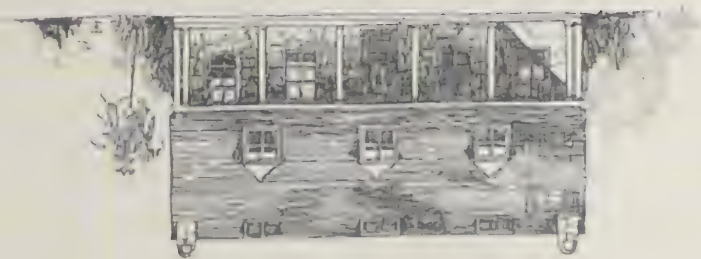
SMALL HOUSES

steps the living-room may be seen through a glass screen at the top. Besides the living-room, the dining-room and two masters' bedrooms, with a bath between, are on this floor, and also the servants' rooms; which, however, are reached from the kitchen by stairs to the pantry (see the section). Two more masters' bedrooms are on the first floor. From the side elevation it will be seen that the build-

ing consists of a main part on the side toward the garden and a subordinate part on the road. In the latter is placed the service department. Between these two parts a one-story connecting-link contains the dining-room, staircase, etc. A verandah extends across the full width of the house on the garden side, which is about 10' above the road.

Table of Modules

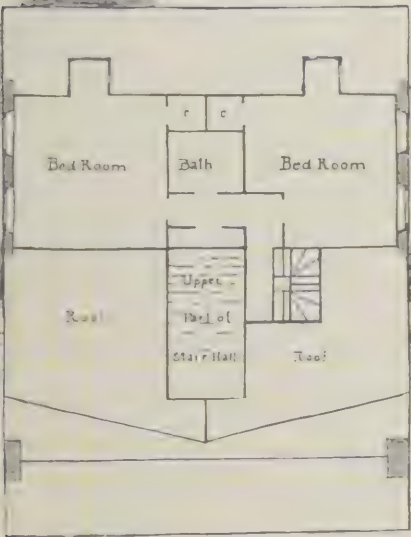
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13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"



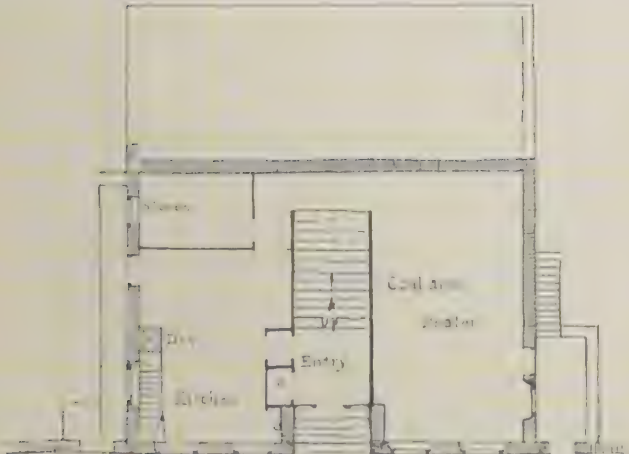
Side Elevation of Flegg House



Elevation on Flegg Place



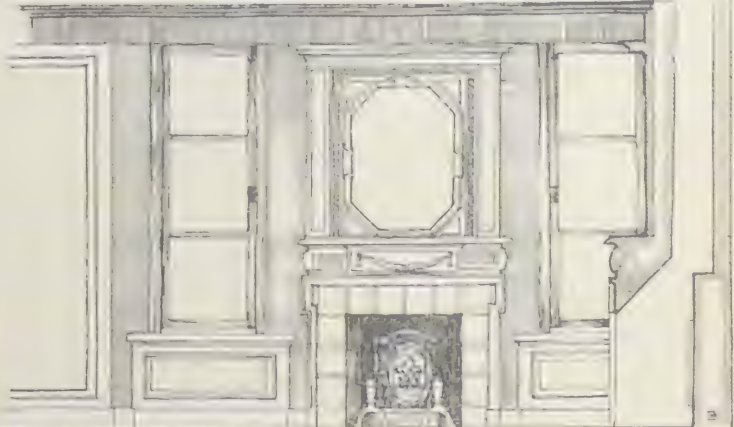
Plan of Upper Floor



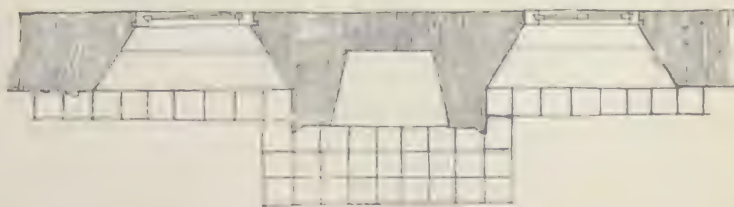
Plan of Lower Floor



Perspective View of Stairs from Entry to Living Room



Detail of Fireplace Mantel



Detail of Roof Structure

CARPENTRY

THE interior woodwork called for in these designs is, in general, of a different type from the usual in houses of a similar class, being of a more simple, primitive, and direct kind. During the Middle Ages, and probably always before that time, interior structural members were made presentable and shown, but the modern custom has been to conceal them by casing. This necessitates two operations instead of one, and involves additional materials, labor, and expense. The only apparent object for this roundabout way of building is to avoid the possible natural defects which might be caused by exposure of the solid members to the dampness of the building while under construction. If this is so, it certainly indicates perverted taste. The smug smoothness of the sham is preferred to possible irregularities of a kind which only serve to show that the work is genuine. As well might one prefer machine-made lace to the real article, on account of its greater regularity and exactness. In actual practice, defects of this sort detract little from the fine appearance of woodwork. To one of cultivated taste they are more apt to produce agreeable than disagreeable impressions, because they indicate honest methods and reasonable use of materials. What man of taste, for instance, would not prefer a check or crack in *boiserie*, cut from the solid, to the unblemished appearance of the *appliqué*? But if reasonable precautions are taken, such defects will seldom occur. If care is used in the selection and seasoning of the wood, they may be practically avoided altogether. Where so much is to be gained by these methods, one may well afford to take pains in their use. The wood of which the structural members are made should be of good quality, well seasoned, and the workmanship carefully done. If one adds half the cost of the casing which is abolished to improving the quality and appearance of the exposed structural members, he will still come out 50 per cent ahead.

The principle that dishonest methods in design and construction lead to bad results is as unfailing in its operation as the law of supply and demand. The casing in and covering up of structural members leads to poor and careless workmanship. If a thing is to be concealed from view, why take pains with it? Thus poor craftsmanship is fostered and makeshift methods encouraged. If the dishonest methods reduced cost there would, at least, be that much in their favor; but if they act in a contrary fashion, there is a double reason for their rejection. There are, indeed, such sound reasons for the rejection of casing that one wonders at its continued use, and can only attribute it to force of habit. Consider the details of Plate 21. The contrast between the solid door frame and base and those of the usual kind is simply amazing. The saving in material, labor, space, and the gain in appearance is so striking as to be almost unbelievable, if the demonstration had not been made complete by actual use.

Now what are the offsetting disadvantages of these methods? Simply that the solid members must be installed before the plastering is done, and that the dampness may injuriously affect them; also that solid members sometimes check, warp, or twist. But these dangers are very slight where reasonable precautions are taken. In the several experimental houses built at Dongan Hills, in which these direct and simple processes have been tried, not a single case has occurred where a door frame or base has given trouble. But even

if several had done so, the cost of correction would have been as nothing in comparison to the gain over common methods. There can be no doubt that concealment and sham in interior finish has been carried too far; it is the result of a habit, the cost of which no one has taken the trouble to calculate. It is bad construction, bad art, and bad economy.

The exposed beam ceilings as used in these houses and explained in Part XXX, on the subject, and illustrated by the detail drawings on Plate 30, are most attractive and economical features; but owing to the size of the members, their exposure to the elements before the roof is on, and the dampness of the house during construction, some movement is sure to take place in them. Certain beams may warp, twist, or check. This has happened in several cases, but never to such an extent as to constitute permanent disfigurement, although it has necessitated slight adjustments after the work had taken its final bearings; but the cost involved was so slight in comparison to the gain, both in economy and appearance, as hardly to be worth mentioning.

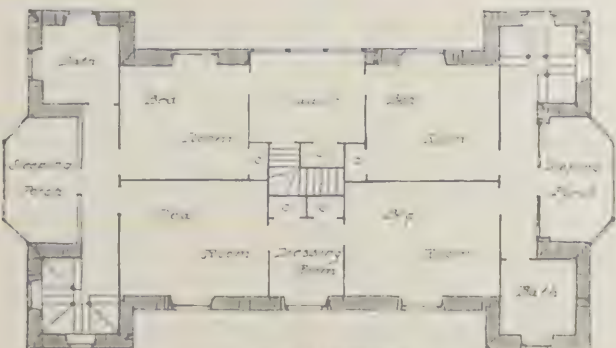
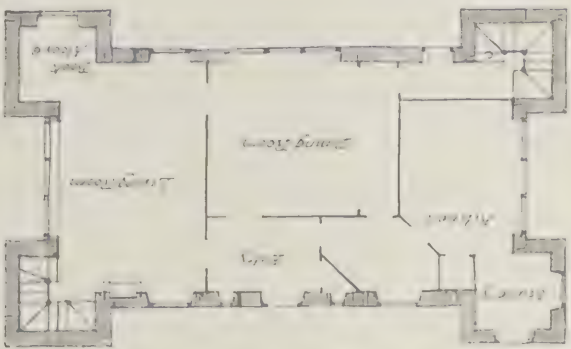
In woodwork of the usual kind for small houses there are, as has been said, two operations, commonly spoken of as carpentry and joinery. Carpentry deals with the structural members and joinery to a great extent with their concealment.

If one compares ancient with modern woodwork, he can hardly fail to be impressed with the great difference in character between the two. Consider mediæval woodwork, for instance. The thing which immediately impresses the beholder is the evidence which it displays of loving care on the part of the craftsman—a quality in strong contrast with the modern article. There must be some very good reason for this difference. That it is not due to the use of machinery is shown by the fact that this same difference appears between mediæval work and that of a century or more ago when machinery was not so much used as now. The true reason for this difference is not hard to discover. The work of the modern carpenter is to be concealed, and the work of the modern joiner is in large measure a sham. How can the craftsman take much pride in either operation? The work of the mediæval woodworker was not a sham, neither was it to be concealed. It was therefore a thing to take pride in. If we want woodwork of that character, it is simply necessary to revert to the processes which produced it. Discard shams and introduce honest methods of design. When this is done the results will automatically be the same. The change would, as these designs prove, result in an enormous saving of labor, space, and materials, with a corresponding gain in artistic results, even though it be more largely dependent on shop and machine work.

The so-called “modern improvements” in woodwork are like many other “modern improvements”—no improvements at all, but the contrary. They are not improvements, but simply changes and bad ones. In building, the pendulum slowly swings backward and forward. At present it has swung too far in the direction of sham and complication and away from truth and simplicity; a reaction is due, and it is hoped that this work may help start it. In this matter a move forward may be made by taking a step backward or, rather, by retracing a false one. The art of building is the oldest art there is, and modern builders may learn much from their predecessors.

Table of Modules

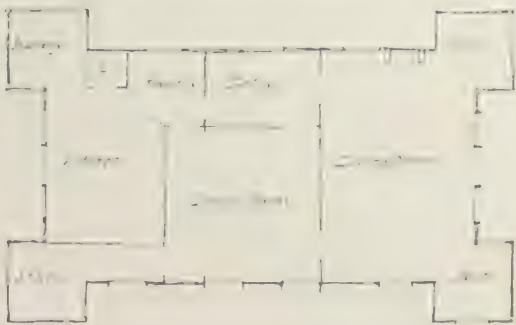
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10 "	- 37'-6"
11 "	- 41'-3"
12 "	- 45'
13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"



PLAN OF UPPER FLOOR



Diagram of Alternative Arrangement
Showing Reduction in Land



SMALL HOUSES

Plate 25

This house looks larger and more important than it really is—an effect produced here and elsewhere designedly by the use of scale (see essay on that subject, Part XXIII). By multiplying parts, using rather small details, and especially by keeping down story-heights, the buildings are made to appear more imposing than they otherwise would.

This use of the principle of scale is a legitimate and practical way of economizing in building, for the most for the outlay is thus obtained in securing a fine appearance.

The arrangement of this dwelling is peculiar in several ways. It

is divided into three separate sections, or buildings. The central one has turrets at its angles, in two of which are placed the stairs; the other two contain plumbing. On the upper floor there is a sleeping-porch at either end. The detached building to the right contains the servants' quarters, laundry, and store-room for fuel (there being no cellar), and in the building to the left is placed a loggia, or open-air shelter (in lieu of the usual verandah), and store-rooms. This is an economical arrangement, for one of these two side buildings, at least, could be built for less than a cellar under the main block would cost, and the construction would be above ground, where it can take part in the general composition instead of lying buried.

SURROUNDINGS

BY this is meant the treatment of the grounds contiguous to the house. We all know how a statue gains in dignity and importance by being placed on a pedestal, and how a picture is improved by being set in a frame; but it does not seem to be so generally understood that what is true of the statue and picture is also true of the building. A building placed on a pedestal formed by a terrace gains immensely in importance and dignity. So also a building which is framed in a border, which the French call a *parterre*, is also greatly improved in appearance, and this is as true of small buildings as of great; provided always, of course, that the treatment be proportioned to the thing treated, and harmony preserved between the two. It is eminently fitting that the immediate surroundings of the house be arranged to furnish an agreeable transition between the irregularities of nature and the formality of the building. Moreover, there are good practical reasons for an arrangement of that kind. Walks and paths are needed about the house for many purposes. Agreeable promenades, if in close proximity to the house, are doubly useful; flowers, shrubs, hedges, arbors, and trellises are all agreeable things to have close at hand. Terraces raised above the surrounding land, from which one may overlook the lawns and gardens beyond, are most delightful and useful features. Nor are such things so far beyond the reach of the ordinary individual as most people seem to think. In many cases all that is needed is a little forethought and good taste in planning. The earth from a cellar, if properly disposed, will often produce a low terrace proportioned to the size of the house, and save the cost of its removal to a more distant place; or it may be that the grading, which must be done in any event, will provide the necessary material. If the planting which is so frequently done without thought of its proper relationship to the house were done with that relationship in mind, it would frequently be sufficient to make a *parterre*, or border, of appropriate dimensions for the building. Many an opportunity for quaint and charming effects of this kind is thrown away simply through ignorance or lack of forethought.

Some people affect a horror of any kind of formality in the treatment of grounds about the house; but that is mostly on account of lack of familiarity with good examples of the sort. It is foolish to condemn any mode of treatment based on common sense. Of course formality may be overdone or not properly done, but to condemn it in toto, as many do, is to display a lamentable lack of good taste. In this and many other matters relating to taste our people often have unreasonable prejudices against some things which are intrinsically good, and likings for other things which are not. In refinement of taste we have, as a nation, a long way to go. In many respects we exhibit the instincts of the barbarian. We scour Europe for objects of art, and often make most inappropriate use of them when obtained. This rifling of the buildings and gardens of Europe to satisfy the insatiable demand of the American market for antiques is a form of vandalism which, it seems to the writer, ought not to be encouraged. Many objects lose greatly on being taken from their proper setting. Things which in their original positions and historic environment were possessed of value part with much, and sometimes all, of it on being removed to uncongenial surroundings. When used here they frequently throw out of harmony and spoil the places they are intended to beautify. Many objects which were

at least interesting where they belonged become so incongruous when transplanted in this way as to be simply funny. How many American gardens, for instance, are spoiled by Italian garden furniture, which plays out of tune with everything within sight?

As a general rule it is safe to say that money spent on foreign antiques, whether fake or genuine, for the small American place could better be used in other ways.

Some years ago I was so strongly urged by a dealer to visit an exhibition of his of antique art objects for the garden that, contrary to my usual custom, I went. As a rule I take little interest in such things, for they seldom have much value in my estimation when removed from their appropriate settings, and it seems, as has been said, like vandalism to despoil the Old World by encouraging the importation to this country of things so little in harmony with their new surroundings.

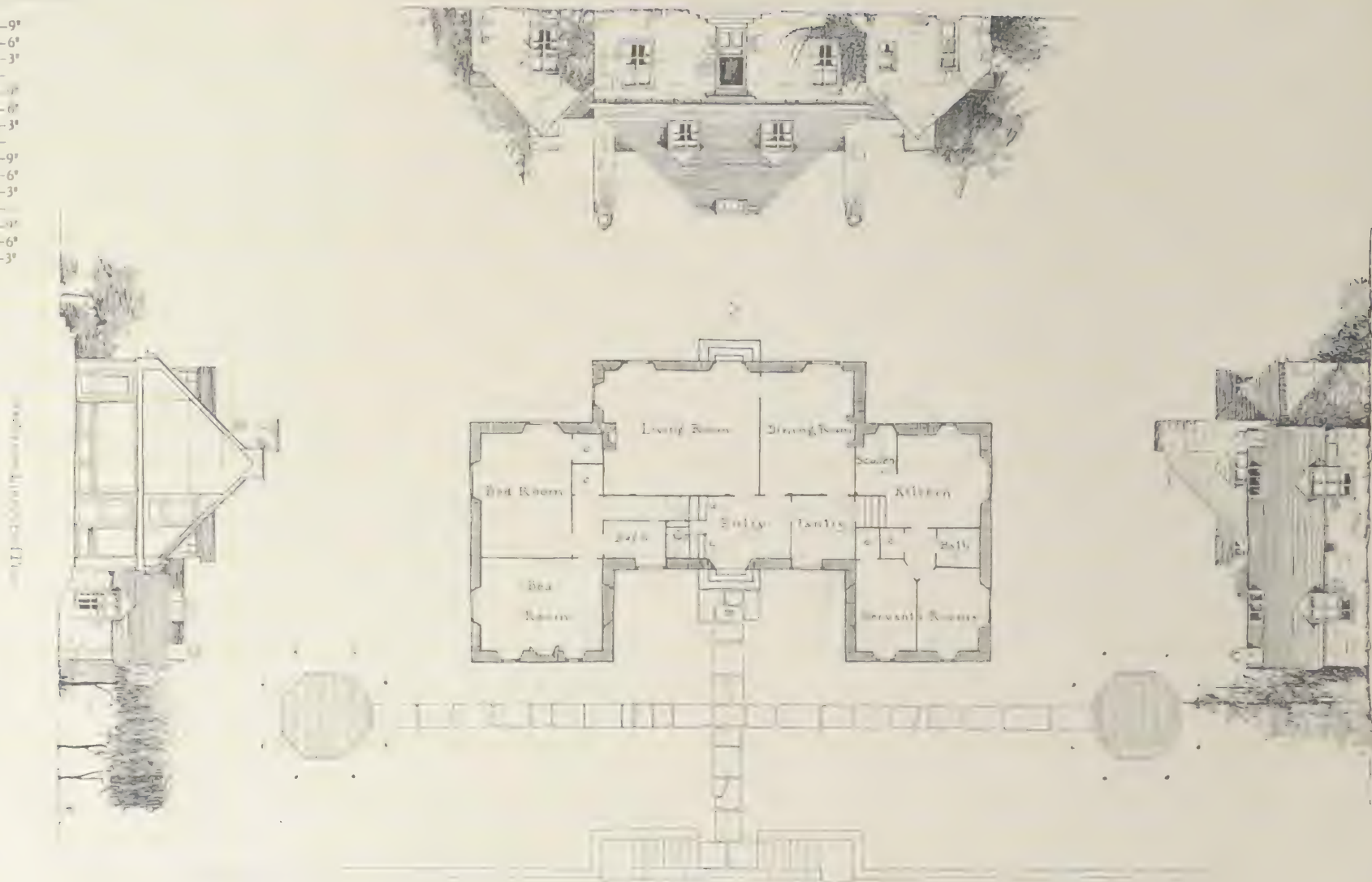
The first things to catch my eye were three huge tombs, or sepulchral mural monuments, which had evidently been taken from some church. I asked my friend, the dealer, how he ever expected to dispose of them. But he knew his market better than I, for it seems they had been sold immediately on arrival, at a very high price, to a gentleman of Philadelphia for the embellishment of the grounds about his house. It called to my mind that other (Western) gentleman whose custom it was, of a Sunday morning, to sit on the porch in his shirt-sleeves and fire with a rifle at the marble statues with which he had decorated his place. He doubtless derived real pleasure from his venture into the field of art; a condition which does not always follow.

Plate 26

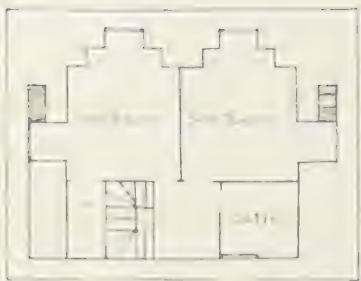
This design illustrates some of the points which we have endeavored to make in the foregoing essay. From it one may judge of the importance the terrace gives to the house. In this case, to be sure, the terrace is simply a bank by the side of the road which the stone retaining wall converts into something more impressive. The straight walk from the steps to the house and the cross-walk between the two arbors impart to the design a sufficient degree of formality. If these walks were bordered on one side or both by a few little stiff box-beds the effect would be in perfect harmony with the size and character of the house, and they, together with the straight walks, which undoubtedly would be needed at the sides and back of the dwelling, would furnish that frame or border for the house which we have been at pains to recommend, and which would improve its appearance almost as much as the terrace-like effect of the bank improves it. In this design the public front, if it may be so called, is presented to the road, while the private front—the one which should be most intimately associated with the home life of the family—is turned toward the garden, upon which both the living-room and dining-room face. Two masters' bedrooms and a bathroom occupy the upper floor of the main body of the house. These rooms could be improved by a little more headroom at their sides, and that height might be given without harm to the proportions of the building. One of the side-wings contains the service department, and the other wing two more masters' bedrooms. The floors of these wings are depressed below that of the main portion of the building. If both floors of the central part of the house were lowered,

Table of Modules

1 m.	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



Elevation on Tod Hill Road



Plan of Upper Floor



SMALL HOUSES

more headroom would be had on the upper floor, as suggested, and the lower one brought to a level with the floors of the wings.

The living arbors indicated in this design will serve as a further illustration of the subject treated of under "Topiary." Here we have a very simple and inexpensive method of obtaining a delightful leafy shelter with little trouble and less expense. The trees of each arbor are set out in the form of an octagon, the center of which

is paved with brick. The only difficulties in making such a shelter are in the first years of the process. Until the shape is well established, upright posts, of the height of the proposed arbor, should be firmly planted in the ground at each angle, and wires strung between to serve as guides in clipping. After which it will only be necessary to clip all branches which project beyond the bounds so fixed. The trees themselves will do the rest.

HEATING

A GREAT change will doubtless soon take place in heating methods. The wastefulness of those now in use reflects seriously on human intelligence. To say that by far the larger part of the heat value of fuel is lost through inefficiency in its use is to keep well within the truth. Roughly speaking, the best heating apparatus delivers about 20 per cent of the heat contained in fuel, 20 per cent is required for draft, and the rest is sheer waste. Seldom is any attempt made to reduce this loss. Fifty years ago stoves for house-heating were much more common than at present, and rooms on the floors above were often heated by drums attached to the smoke-pipe; but drums have now gone completely out of fashion, and the only one I know of in New York is in my own house, where a drum attached to the boiler smoke-flue easily heats



No. 32
Palm house at "Stone Court," residence of the author.

the servants' hall, a room 20' x 25', and this with no perceptible cooling of the pipe.

Some years ago I needed more space for palms and enlarged the building shown in Photograph 32 by adding two bays and introducing a skylight. I determined to heat the room thus formed, which is 50' long and 25' wide, by waste heat, so a new chimney was built at the far end, the old one capped up, and smoke from the heater conducted to the new chimney through two 9" sheet-metal smoke-pipes hung from the roof. This gave 250 square feet of heating surface, which is sufficient in the coldest weather, without burning a pound more fuel than was used before.

The German porcelain stoves are very economical of heat. At least this is the opinion I formed of them on very slight acquaintance, and, if so, they well illustrate two German characteristics—efficiency and lack of taste—for the stoves are ugly, and it seems beyond Teuton ability to make them otherwise. Like the Irish boy who said, "The more you call me the more I won't come," so the more the German tries for beauty the less he gets. But to return to the stove. In traveling through Germany I once met with some cold and dis-

agreeable weather. In my room, at the hotel, was a porcelain stove of extraordinary size and ugliness. I ordered a fire, and a little bunch of fagots was brought up, which I supposed was intended as kindling-wood; but to my surprise no more fuel was needed. With this apparently insignificant quantity the room was kept at an agreeable temperature for hours. The human body itself is a most efficient stove, capable of maintaining warmth and energy on an extraordinarily small quantity of fuel. There is no doubt that if a very small percentage of the heat which goes up the chimney of the ordinary house could be captured, the cost of heating might be greatly reduced.

From what has been said it will be seen that exposed stovepipes in rooms are very efficient heat-economizers; but there are objections to them which, in most cases, would more than offset the gain in efficiency. Stovepipes are ugly, must be frequently cleaned, are short-lived, and, if there is dampness in the fuel, may leak. Notwithstanding all this, if I were again to build a house for my own use, I should employ them for saving heat. One way of doing so, without much inconvenience, would be to build a large rectangular shaft to take stovepipes from the kitchen, laundry, and furnace fires. This shaft should be closed at the top, and air, from outdoors, conducted to it at the bottom by fresh-air intakes like those of ordinary furnaces. This air would become heated and rise, entering the rooms through register openings in the walls. It should in this way be possible to heat the upper floor of the house by heat otherwise wasted.

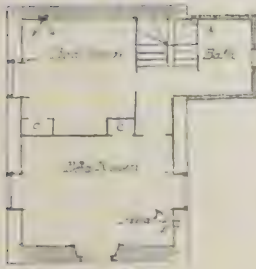
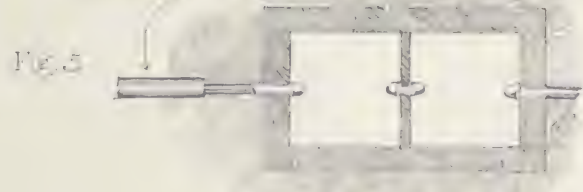
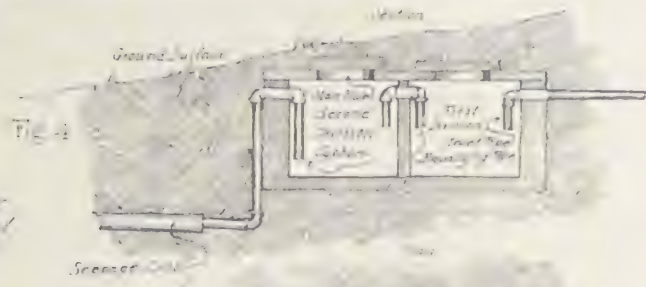
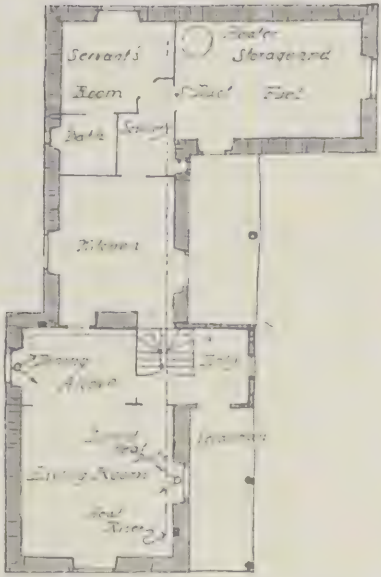
Cellars are, as already stated, expensive to build and generally unsanitary (see Part XVIII). Houses, if properly constructed, are better without them. It seems to the writer that the only legitimate excuse for a cellar in the ordinary house is to provide a place at a lower level for the heater, but if the heater must be depressed, would it not be better to provide a pit for it in a storeroom, most of which is above ground? Steam and hot-water heaters are now being made for houses without cellars. Cannot hot-air heaters of this sort also be made? Although the experiment has not yet been tried, it seems likely that electric fans can advantageously be used with hot-air furnaces to supply the necessary motive power where the furnace is placed at the ground-floor level, and the houses of Plate 27 have been designed with a view to trying out that theory. The fan will be attached to the fresh-air intake as indicated in Figure 3. Very little energy should be needed, and the fan which it is proposed to use will consume only a few cents' worth of electricity a day. By the use of the fan it is thought that the multiplicity of ducts, with which the ordinary furnace is usually equipped, may be dispensed with, and all the hot air necessary, driven through one main duct, from which branches will lead to the various rooms. The duct will consist of a clay pipe, well insulated, below the floor of the ground story. As the air will be under slight compression from the fan, the heat outlets may be smaller than usual. As here designed, the hot air must pass through the main duct at about three times the usual speed. The movement will, of course, be helped by the natural tendency of hot air to rise in the vertical ducts.

Crude oil for heating purposes is now beginning to be introduced, but so far little more has been done than equip the fire-boxes of the present inefficient coal-heaters with oil-burning devices. Why should not the oil be piped to the rooms or places where the heat

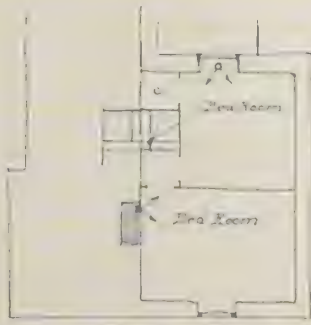
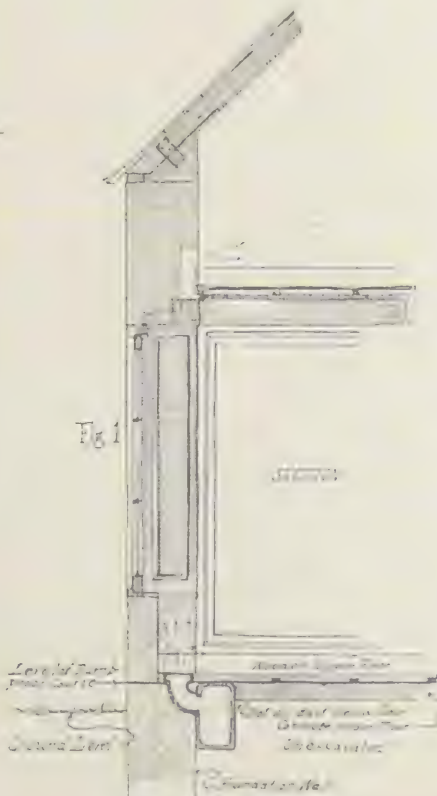
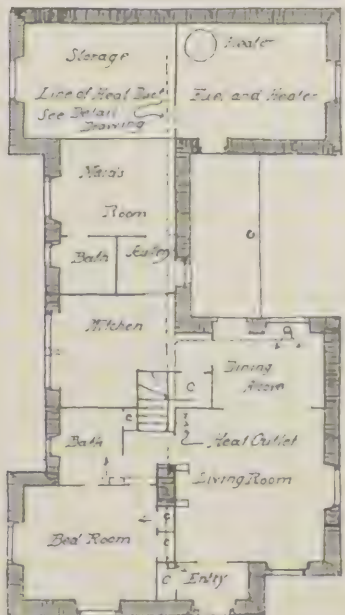
No. 27

Table of Modules

1	m	-	3'-9"
2	"	-	7'-6"
3	"	-	11'-3"
4	"	-	15'
5	"	-	18'-9"
6	"	-	22'-6"
7	"	-	26'-3"
8	"	-	30'
9	"	-	33'-9"
10	"	-	37'-6"
11	"	-	41'-3"
12	"	-	45'
13	"	-	48'-9"
14	"	-	52'-6"
15	"	-	56'-3"



House A Above
House B Below



SMALL HOUSES

is wanted, and burned there in such a way as to utilize most, if not all, of the heat contained in it, and with the fire exposed to view, so that both the heat and cheering influence of an open fire may be had and waste in transmission avoided? In the future perhaps this may be done, the oil-burning appliances displacing the present unsightly and miscalled radiators.

Plate 27

In each of these little houses an alcove off the living-room is intended to serve as a place to eat. Also, in each one a storeroom above ground is provided in lieu of a cellar. Exclusive of this storage

space and the alcove, House *A* has five rooms and House *B* six rooms. In each house two of the bedrooms are on the upper floor. In House *A* the masters' bathroom is up-stairs and in House *B* it is on the ground floor. Each house has also a bathroom for the maid and a scullery. The latter should greatly improve the kitchen by relieving it of all dirty work and making it a more suitable place to sit and eat in. Although the storage space in each house is liberal, the cost of providing it above ground would be much less than the cost of a cellar.

As explained above, the method to be employed in heating these two houses is purely experimental.

SOME writers contend that beauty depends altogether on fitness; that it is, indeed, the fitness which constitutes the beauty. And it does seem as if the example of the human form almost bore out that hypothesis. While it cannot be said that fitting objects are always beautiful, it is true that if beauty were added, their fitness would not be impaired, but generally increased.

Sometimes objects which are fitting, but which do not impress us as beautiful, have a great deal of beauty about them which appears when looked for. We speak of a machine which does its work well as beautiful, even though its general form and aspect may be far from beautiful. Its fitness is its beauty. The Ford automobile, for instance, can hardly be called beautiful, yet it is fitting in that it does its work well. When one examines the thing closely, however, he sees that the parts upon which its success chiefly depends—the engine, running gear, etc.—are not the ones which offend. They form, indeed, a very pretty piece of mechanism, and the ugliness of the conveyance consists almost entirely in the lack of taste displayed in the design of the body and hood, which, in themselves, are not wholly fitting, because they give no pleasure to the eye.

Many people who lack refined taste think beauty of no consequence. Some seem actually to pride themselves on that belief. They say: "I don't care for beauty; give me efficiency." They fail to realize that efficiency, in large measure, depends on beauty. The best animals are the best-looking; the best workmanship is the most sightly; the most beautiful utensil or piece of furniture is commonly the best fitted for use. The person, therefore, who seeks efficiency devoid of beauty is not apt to find it. Beauty and efficiency ought to go hand in hand, and they generally do.

Architecture is artistic construction, or the art of making construction beautiful. Beauty is, as we have seen, dependent largely on fitness. It is difficult, indeed, to think of beauty without fitness. Fitness is certainly a chief element of beauty; therefore, beautiful construction must be fitting construction; that is to say, reasonable construction. If it is admitted that beauty is dependent on fitness, and fitness be lacking in a work of construction, then that work can hardly be called architectural, for it stands in conflict with the very definition of architecture—lacking beauty, without which construction is not architecture. It follows from this that the use of reason, or logical thinking, should be of the greatest aid in obtaining beauty in design. If fitting forms be given to the materials used, that is, forms fitted both to the nature of the materials themselves and the manner of their use, those forms and methods should have much to do in obtaining beauty, for such forms and such usage should appeal to reason and excite admiration. When one looks back through the history of art he sees this truth sufficiently demonstrated. He finds that in all recognized masterpieces of art the forms and methods used have been most reasonable and most well suited to the object of the work. He also finds that of all art objects, those which have excited the greatest admiration are representations of the beauty of the human form, and in no other object is form so perfectly fitted to use as in human shape.

To obtain success in architecture, therefore, the designer should be led by his program and the natural qualities of the materials

he works in. They should influence the forms given to the structure and to the materials of which it is composed. He should act as medium between the requirements of use, on the one hand, and the means of supplying those requirements, on the other. If he allows himself to be led in this way, much of the designing will be done for him by the simple use of reason or common sense; in exercising which he will have called into play the highest faculties with which he is endowed.

If, instead of allowing himself to be thus led by common sense, he seeks to force on the program some preconceived plan or unreasonable conception, trouble and failure must surely follow, because he will then have discarded reason from his work and reared an insuperable barrier to success.

Undoubtedly we have a difficult problem on our hands; the steel frame is a most unsympathetic affair, having about it an air of hard utilitarianism not easy to associate with ideas of beauty. But difficult as the problem is, it is not more so than the one which confronted the medieval builders upon the introduction of rib-vaulting in the twelfth century. For several hundred years the builders of western Europe, inspired by Roman remains, had been endeavoring to cover their churches with stone roofs. In the twelfth century some one hit upon or revived an expedient which greatly reduced the difficulty. Instead of constructing the vault in one operation, as heretofore, the builders now made a framework of narrow stone ribs or arches, transversely and diagonally spanning the areas to be covered, then filled in the panels so formed with stone blockage. The thrusts were thus concentrated at the points from which the ribs sprang, and it simply became necessary to fortify those points; which they did with buttresses and arches. The walls between the buttresses might, so far as strength was concerned, be omitted, a condition they were not slow to take advantage of, and light screens of stone and glass were substituted for walls.

The program then was: a stone roof, props to keep it from spreading apart and falling down, and light screens between the props. Could there be more unpromising conditions for obtaining beautiful results? Yet we see at Amiens to what heights even such a program may lead when construction and design go hand in hand, guided by the eternal principles of good art.

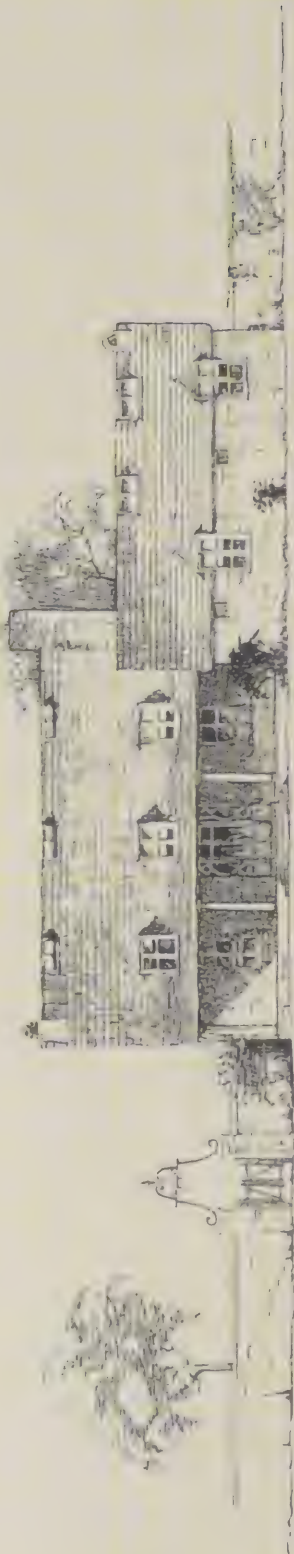
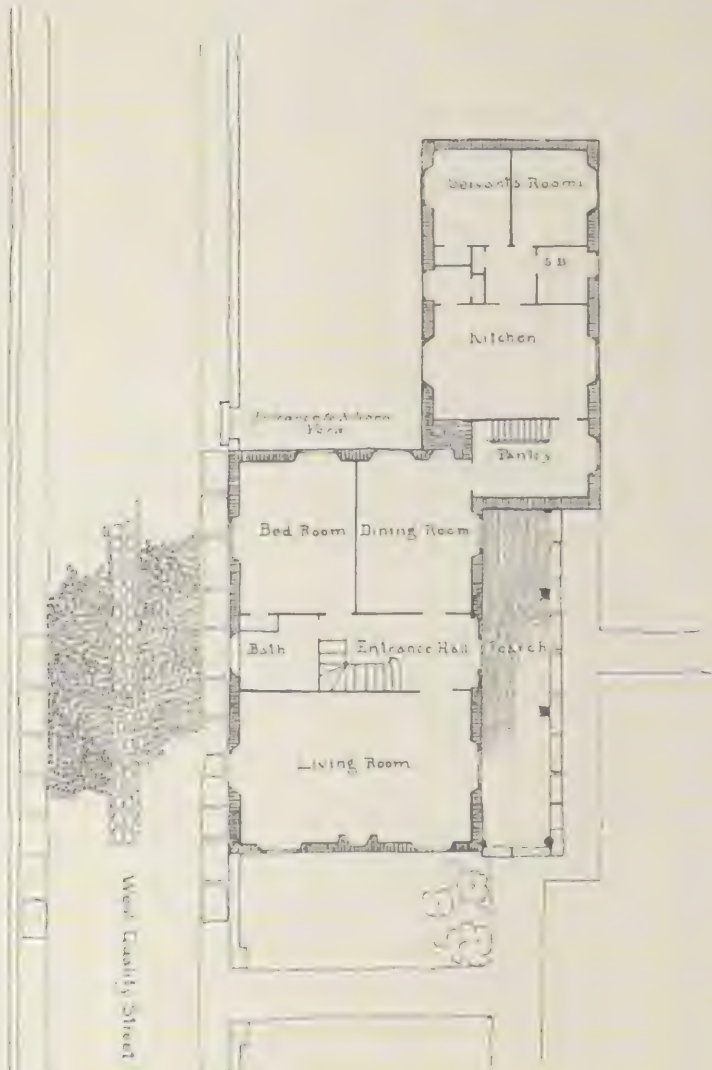
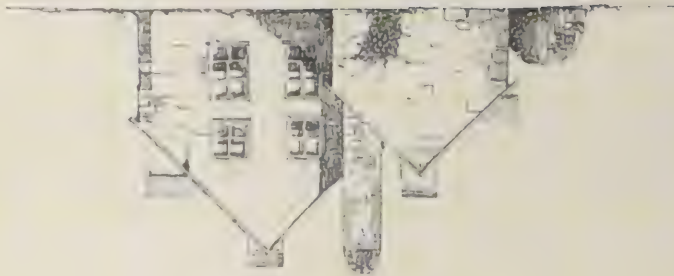
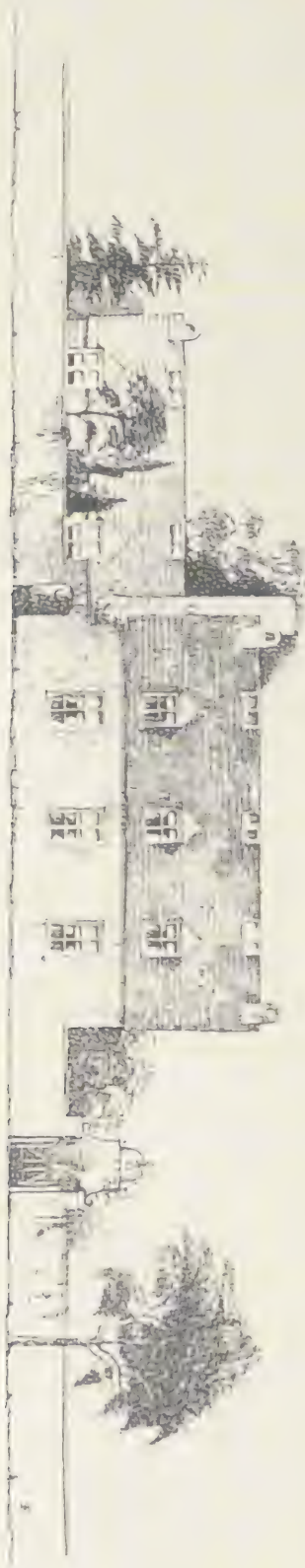
Now we have somewhat similar conditions; again walls may be discarded, and the spaces between the steel columns filled at the fancy of the designer. The program offers boundless opportunities for the display of invention, taste, and skill, but the problem is architectural, and neither archeological nor engineering methods are adequate for its solution.

It may seem to some that the steel frame has little to do with small houses. This may be true of the frame itself but not of the methods of design applicable to it. Those methods apply to every artistic construction, whether steel or otherwise, and if we have not the wit and ability to apply them in the one case, we can hardly hope to do so in the other. The idea that it requires one kind of skill to deal successfully with the design of the tall building and another for that of the small house is fallacious; both alike are architectural problems, and in both alike the immutable laws of right design govern. When we have true architecture in the small house, we shall also have it in other buildings, and vice versa.

Table of Modules

1 m	=	3'-9"
2 "	=	7'-6"
3 "	=	11'-3"
4 "	=	15'-0"
5 "	=	18'-9"
6 "	=	22'-6"
7 "	=	26'-3"
8 "	=	30'-0"
9 "	=	33'-9"
10 "	=	37'-6"
11 "	=	41'-3"
12 "	=	45'-0"
13 "	=	48'-9"
14 "	=	52'-6"
15 "	=	56'-3"

Illustration of House, facing Street



Plan of Upper Floor



SMALL HOUSES

Plate 26

This design is fairly typical of the very simple and primitive character of most of these houses. It depends for what attractiveness it has almost entirely upon the agreeable proportions and relationship of the two parts which go to make up the composition; yet the building has an interesting and comfortable appearance, and it certainly would be a pleasant house to live in. The site is at the side of a short paved street which leads to a little place upon which another house is to face.

The main part of the building is for the family and the wing for the servants. It is easy to see that the garden is on the side of the house away from the road, overlooked from the verandah, and screened from public view by the house itself and the garden-wall.

Also that the service yard is between the service wing and the boundary wall, convenient of access from the road by people who have business there, without disturbance to the family. The plan is economical in that there is no waste space, and the area devoted to communication is reduced almost to the limit of possibility, there being no corridors; but, on the other hand, the same accommodations might easily be had with much less extent of wall, that is, by increasing the size of the main part of the house and omitting the service wing. The result gained in economy might, however, in that case, be more than offset by the loss both in picturesqueness of appearance and convenience for use. The design would then be of a different type, for the distinctive feature of this one—the separation of the service department—would be lost.

UNITY

UNITY is an essential element of good design. Without it a thing is not a thing, if one may say so, nor even a collection, for that term implies unity. Just what a design may be without unity, it is hard to say; but certainly not a work of art.

When one consults the supreme standard of taste in design—man as nature intends him to be—on the subject of unity, he finds it expressed in several ways—spiritual and corporeal; unity of purpose and unity of mass. It is the latter quality which it is now proposed more particularly to consider.

In the ideal human figure one finds unity of mass in the whole form and every constituent part of it. In each one separately and in all together there is unity of mass. Head, arms, legs, hands, feet, and all other subordinate parts have a mass which dominates and gives unity to that particular part, just as the trunk of the body dominates and gives unity of mass to the whole composition. And so it must be in all good design; each component part, no matter how important or insignificant, must be designed to have unity in itself, and the same quality must be found in the whole composition. Whether the design be for a great building or the smallest detail connected therewith, the same rule holds good.

The principle is illustrated in every properly designed object. In the baluster, for instance, Figure 1, each group of moldings has one member which predominates and gives unity to that group just as the shaft of the baluster predominates, supplying unity to the whole composition.

When there are a number of similar things used together, they may be so combined as to form one motive having unity of mass, as where a number of these same balusters are used in a balustrade, columns in a colonnade, or arches in an arcade. A like effect can often be obtained by symmetry of arrangement. Thus in Figure 2 the baluster is composed of two similar parts; but because they are symmetrically placed with respect to the central axis, they combine to form one motive, and the dominant part in each half unites in forming a dominant motive for the whole design; while in Figure 8, where similar parts are used without symmetry of arrangement, no such result is obtained. Here there is no unity and the design is bad.

In Figure 9 there is a balance of mass without similarity of outline, but the result is not good because the design is confused. In the two halves of this baluster the mass is about equal, and it is also symmetrically placed with respect to the common axis; but because the outline of each half differs, the two do not combine to form one object, as they do in Figure 2.

If a dividing-line is placed on the walls of a room, at half the height or thereabout, such as would be caused by a band, a change in color, a molding, or by a wainscot to half the height, as in Figure 4, the effect is so disagreeable that it should be apparent to any one. The bad appearance is doubtless due to a lack of unity, which defect immediately disappears when the division is made at any other height, for just as soon as one part of the wall surface predominates, as in Figure 3, unity is restored. A similar disagreeable effect is produced, but to a less marked degree, by a vertical division at the center of the composition, as in Figure 6. If, however, the design be divided into three, five or any other odd number of similar vertical parts by objects of the same kind, no disagreeable

results follow, because they readily unite to form one motive. If the number of parts are equal, as two, four, or six, one of the divisions, falling on the center, appears to bisect the composition, so that the parts do not so readily unite to form one motive; but the result is not always bad.

It appears from this that an horizontal division in the center, dividing the composition into two equal parts, is bad; apparently because it deprives the design of unity; also that a vertical division in the center is for some reason not always bad. It is because of this, doubtless, that casement windows, where the division is vertical, are so much better-looking than double-hung windows, where it is horizontal. Double doors in an opening are entirely unobjectionable, although they may divide the opening vertically into two equal parts; but if the opening were divided by an horizontal line at about its center, the effect would be most disagreeable. Why there should be this distinction is not altogether clear. Perhaps it is that the separation by a vertical line on the center is not so complete as by an horizontal one; the vertical line often serves to accentuate the axis; indeed, man himself and most things made by him have symmetry at either side of the vertical axis when viewed from front or rear.

If a design be composed of several parts of about equal size which are not alike, or not in the same plane, they may not unite to form a unit, and as no one of them predominates to give unity of mass to the composition, the result is likely to be bad, as in Figure 6; whereas in Figure 7, where the central part does predominate, the result is good. In this case, even if the central motive did not predominate, the design would hardly be deprived of unity, because of the curious effect of what may be called penetration of motive. The eye or the imagination connects the two sides or wings into one motive or mass against which the central feature seems applied; therefore, even if the central part was of the same size as each of the wings, the design, although divided into three equal parts situated in different planes, might still be said to have unity; but it would lack variety and be bad for that reason, if for no other.

Penetration of motive, or the carrying through of lines, surfaces, or members by the imagination, plays an important part in design and should be understood. How true this is may be seen by Figure 11. The disagreeable effect of stopping the molding at the right, against another molding, is not felt when it stops against a body capable of holding the penetrating lines. In the first case we feel that it should penetrate and reappear beyond the molding against which it stops. This idea of penetration was much used in late Gothic architecture, where one often sees a little base projecting from a wall or pier and finds that it belongs to some shaft or molding, which, perhaps far above, dies into the wall, but which the imagination of the designer carried down inside the work and supplied with a base at the proper place.

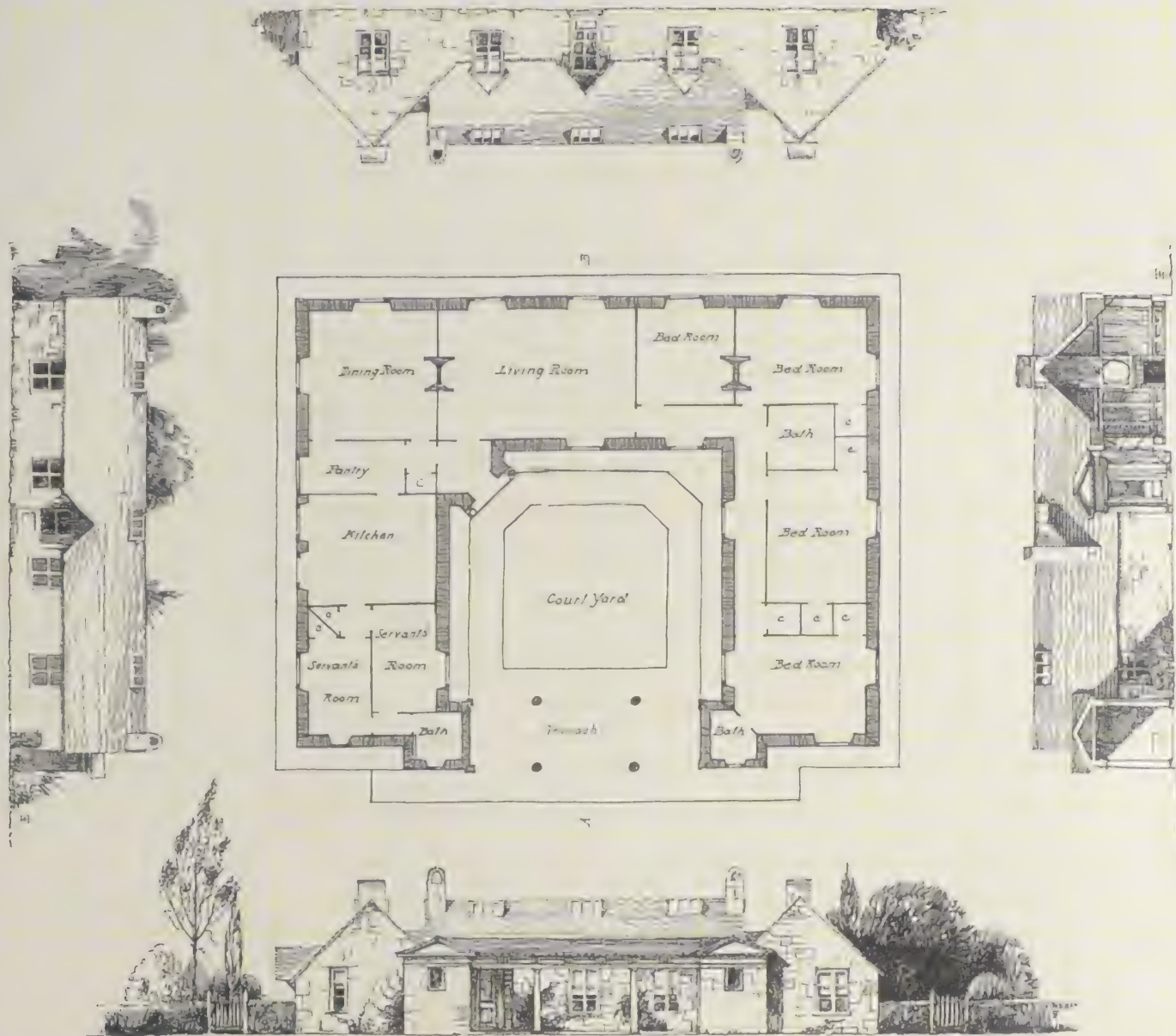
Plate 29

The chief peculiarity of this design is the placing of the piazza across the entrance of the court.

The U-shaped plan is always interesting, but generally wasteful of space in corridors. Here the loss on that score is not great; indeed, very little more corridor is used than would be found in a more

Table of Modules

1	"	=	3'-9"
2	"	=	7'-6"
3	"	=	11'-3"
4	"	=	15'-0"
5	"	=	18'-9"
6	"	=	22'-6"
7	"	=	26'-3"
8	"	=	30'-0"
9	"	=	33'-9"
10	"	=	37'-6"
11	"	=	41'-3"
12	"	=	45'-0"
13	"	=	48'-9"
14	"	=	52'-6"
15	"	=	56'-3"



SMALL HOUSES

compact plan for a house of corresponding size. A plan of this sort lends itself well to these methods of construction, and also to the segregation of the different parts of the house. The service department is by itself, the living-rooms by themselves, and the bed-rooms

by themselves. The main entrance is in a corner of the court. There is also one from the living-room to the garden and from the kitchen to the yard. The cellar is under the service wing only.

FLOORS AND CEILINGS

OWING to the module system of planning, which makes their use easy, all horizontal ceilings in these houses are beam ceilings. Ceilings of that sort under ordinary conditions are so troublesome to lay out and construct that they cost more than plaster and are found generally in expensive houses only, where the chances are ten to one that the beams are not real but "make-believe," as children say. Sham beams are used for fear solid ones might check—the certainty of a fake being preferred to the possibility of a so-called defect of a different sort. Experience in these houses has shown that a good deal may be saved by using real beams, or rather by not concealing them, for beams must be used in any event. The cost of dressing the lumber and using a little better grade of material and workmanship than usual is more than offset by the saving in plaster; besides which, the space between the beams is gained. No more lumber is used than with the plastered ceiling; not so much, indeed, for the weight of the plaster need not be provided for; but the beams are heavier and more widely spaced. In order to look well, it is of course essential that they be symmetrically spaced with regard to the other features—such as windows, doors, fireplaces, etc.—but with the module system of planning that works out automatically. Photograph 33 shows one of these ceilings. The room is rather large, so girders were used with intermediate small beams. In ordinary cases the beams take the full span. The ceiling is formed by the underflooring of the room above, which again makes it necessary to use a better grade of stuff than would be required for an under floor, and dress one side of it. After this first covering comes a layer of building-quilt, as a deafener, on top of which are laid (not nailed) 1" strips of wood to which the upper floor is fastened. The deafening is more effective if these strips are not nailed to the ceiling boards, and the cost of the nails and labor of driving them are saved. The nailing strips provide a space of 1" between floor and ceiling boards in which to run electric conduits, etc.

By this arrangement it will be seen that, exclusive of beams, the space occupied by the floor is only about 3" as against at least 1' ordinarily. This saving in height generally improves the appearance of the house and reduces cost, besides which all walls are lowered, plumbing and other pipes shortened, and one step, at least, saved on every flight of stairs. Moreover, the space between the beams, otherwise wasted, is brought into use. The sum total of these economies goes far toward paying the cost of the floor. Visitors to these houses are often surprised to see such beautiful ceilings, and of a kind usually associated with more pretentious houses, used in servants' rooms, kitchens, storerooms, etc., and find it hard to realize that they cost less than ordinary plastered ceilings. In some cases plaster boards and the like have been used between the beams instead of the underflooring, but the result has not proved so good nor economical.

On Plate 30 are a number of sketches illustrative of these methods. Figure 1 is a section through a part of a floor immediately above a window. It shows the lintel, across the window embrasure, into which the beams are housed. Figure 7 shows the end of one of these beams. This method of framing is convenient, because if carefully done the beam is held very firmly in its seat and is not apt to twist. In Figure 3 there is a half-plan of the soffit showing the two

lintels which may be seen in section in Figure 2. Figure 3 also gives a half-plan of the lintels from above. The main lintel is quite an affair, extending as it does across four of the beam spaces. This is the method used when the lintels are exposed to view from the room. In Figure 4 the window-head is dropped and the lintels are concealed by plaster. This latter method is the one commonly used in these designs, but the other is preferable for several reasons: by raising the window-head, better light is obtained in the room, the construction is more sound and logical, and the cost is less.

By thus exposing the ceiling construction, all plastered ceilings are eliminated and their cost saved. This saving is considerable both in time and money, and in using ceilings of this kind one can well afford to take pains to make them attractive. The lumber should be well seasoned and of the best quality, with workmanship to correspond; but no matter how well made, there will at first be some warping and twisting of beams, and one who objects to that had better not use ceilings of this kind, or else make up his mind to spend the little required to correct such defects as appear a year or two after the beams are in place, by which time they should have taken their permanent shape and bearing.

For the usual spans of these houses 4" x 6" or 6" x 6" beams are strong enough. It would be somewhat more economical to use thinner, deeper beams, but they would not look so well. The spacing is on the module and half-module, *i. e.*, 22½" from center to center. Whatever spacing is adopted, it is best to adhere rigidly to it throughout. There are places in every plan where, to the inexperienced, it might seem wise to depart from the strict observance of this rule, but the chances are that in so doing one will involve himself in difficulties. If the uniform spacing of the beams is observed the troublesome places are few, and it is easy to adopt standard ways of dealing with them. One such difficulty which is very apt to occur at least once, in most of these plans, is at projecting interior angles of walls, of the kind seen at the kitchen and entry in the plan of the little house on Plate 30. Here the inside of both walls runs on module lines. Also a beam and girder which meet at this point are centered on those same lines; therefore, neither beam nor girder will have proper bearing on the wall unless some expedient is used to provide it. The best one which the writer has found is illustrated in Figures 5 and 6. A short piece of 4" T iron, which need be only about 15" or 18" long, is built into the wall, one end projecting far enough to provide seats for the beam and girder, which are countersunk to receive the web and flanges of the iron. The ends of the timbers are also fastened together by a concealed bolt which passes through a hole in the web. Sometimes when the span is great, girders are used upon which small cross-beams rest (see Photograph 33).

The method of laying floors in those rooms of the ground story under which there is no cellar is described under "Foundations and Cellars"—Part XVIII.

Experiments have proved that it is not generally advisable to use exposed rafters where the ceiling follows the slopes of the roof, for that treatment is apt to produce a barn-like appearance which does not occur with horizontal ceilings.

In bathrooms and other places, not on the ground, where tiles are used, the floors are constructed as follows:

Movable forms are placed between the beams, flush with their

SMALL HOUSES

upper surface, and a 1" strip of wood, of about half the width of the beam, is nailed along the top of each beam; over these strips light wire mesh is spread and embedded in 1" of Portland-cement mortar; on this the tiles are laid in that same material. When finished the forms are removed and the cement slab plastered on its under side. This makes a very good and economical floor. The tiles used are 6" x 6" x 1" red Ohio floor tiles, with a 1/2" joint. Such floors are very desirable for bed-rooms too, if we only knew it. Throughout Europe, and especially on the Continent, floors of similar tiles are largely used, being less expensive than wood. They are the easiest of all floors to clean, will not burn, and take wax beautifully. They are ideal for kitchens and laundries because they are so easy to keep clean and look so well. In the kitchens of these houses a wide border of cement and tile is made around a central panel of wood, which is covered with oilcloth or linoleum. Wood is more desirable than tiles for the center of the room, being pleasanter for the feet, but it is not so sanitary; used in this way, its area is reduced to a minimum. Tile borders are sometimes laid around the rooms simply as a decoration, as may be seen in several photographs of interiors under other headings.

Although it has nothing to do with the actual building of the house, it may be helpful to some if a few words are added in regard to the care of floors. In this country, as a rule, we either cover our floors all over with carpet, after the unsanitary English fashion, or else varnish or even paint them. Either of these treatments is an abomination to one who loves a good floor. When a floor has once been varnished or painted, it is done for so far as good looks are concerned, for it will soon become shabby, and add to the repair bill. There is only one proper way to treat a wood floor and that is to wax it. When the floor is cleaned off at the completion of the house, wax it; put on nothing else, and especially no shellac or varnish; nothing is needed but wax and very little of that. The French are past masters in the art of caring for floors; they use nothing but wax; but they do not wax and then neglect it, as is so often done here. They know that the floor must be cared for if it is to look well; but so must any floor, and it is no more trouble to take care of a waxed floor than one of another sort and much may be saved in

carpeting and rugs, for a waxed floor needs little covering. The floor requires only a little wax rubbed on it three or four times a year, and that is work which any one can do. At other times all that is necessary is to go over it every day with a dry cloth and take up the dust. An occasional brushing will make it shine so as to delight the eye. Water is death to wax; but if for any reason the floor becomes spotted or discolored, and it is desired to remove the old wax, it may be washed with water, using "Gold Dust," "Dutch Cleanser," or something else of that kind. If it turns dark after washing, as it generally does, it should be bleached with a little oxalic acid—about a handful to a half-pail of water. After the wood has been wet with this solution, for about a minute, it will become as bright as new, and may be rewaxed. Care must be taken, however, to thoroughly remove the acid, and two pails should always be used—one for the first rinsing of the cloth, and the other for the second. The water used for rinsing must be *frequently* changed.

After many years of experimentation with every kind of flooring on the market, the writer gives it as his opinion that, for the ordinary rooms of a house, as well as for those of a palace, there is nothing comparable to a waxed wooden floor, and for all floors which are likely to be wetted, or which must be washed frequently, nothing is better than common red tile laid in cement mortar with a wide joint.

Plate 30

This little cottage serves as a gate-house at one of the entrances to the grounds of "Stone Court," the home of the writer. It has no cellar, and possesses in other respects the usual characteristics of this method of design and construction.

The house is most pleasantly situated near a little brook and stands only a few feet back from the Todt Hill Road, which crosses the property at this point. It contains six rooms exclusive of the storeroom, two of the bedrooms and the bathroom being on the upper floor. The stonework is a beautiful example of "mosaic rubble." The working drawings from which the building was built are given on Plate 1. Photographs of the house when under construction form part of the illustrations of Part VI.



No. 33
Beam and girder ceiling in "Bowcot."

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 30

Table of Modules

1 m -	3'-9"
2 "	7'-6"
3 "	11'-3"
4 "	15'-0"
5 "	18'-9"
6 "	22'-6"
7 "	26'-3"
8 "	30'-0"
9 "	33'-9"
10 "	37'-6"
11 "	41'-3"
12 "	45'-0"
13 "	48'-9"
14 "	52'-6"
15 "	56'-3"

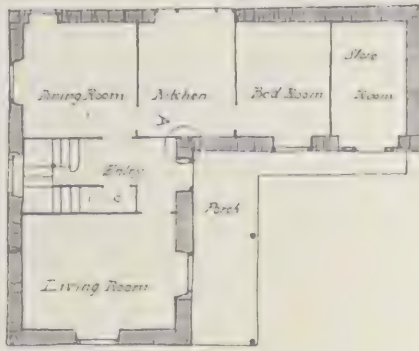
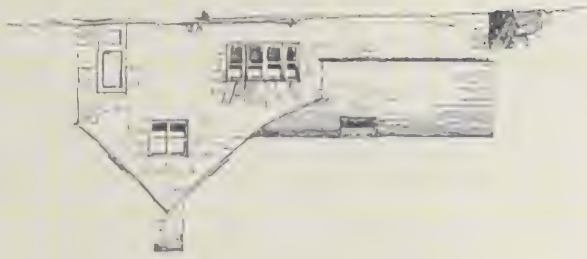
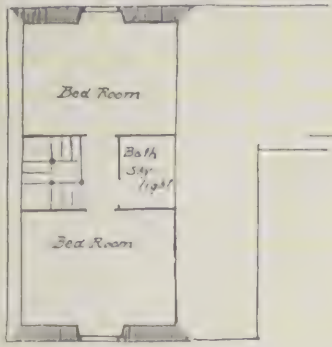
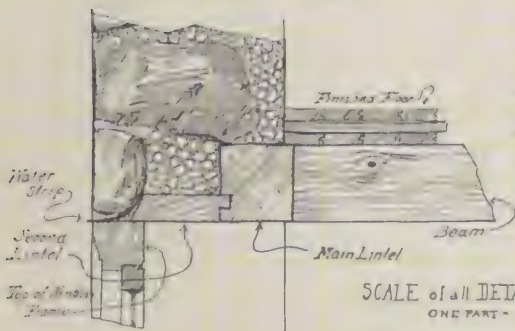


Fig 2



SCALE of all DETAILS on this PLATE
ONE PART = 1 INCH

EXPOSED LINTELS Section through
part of floor and view of upper part of window

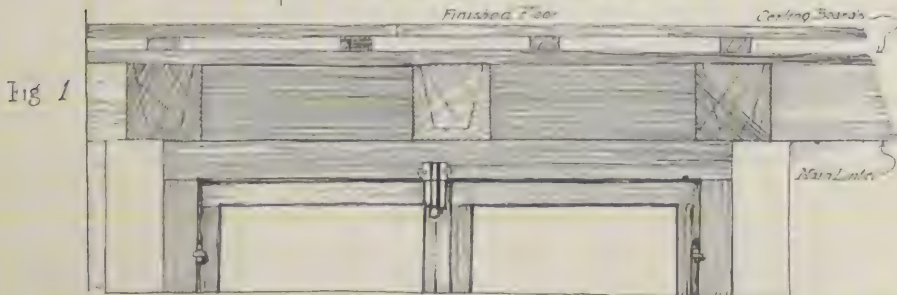


Fig 1



Fig 3

HALF PLAN through
Window Looking Up

ARRANGEMENT of
Lintels Above Window

Main Lintel

Fig 7

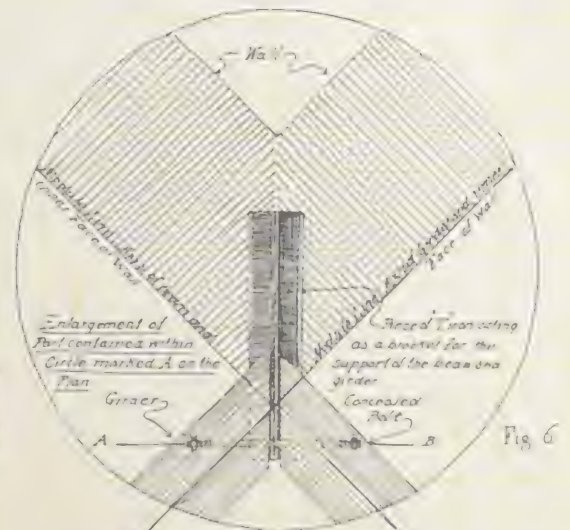


Fig 6

Fig 5

SECTION on line A-B in plan

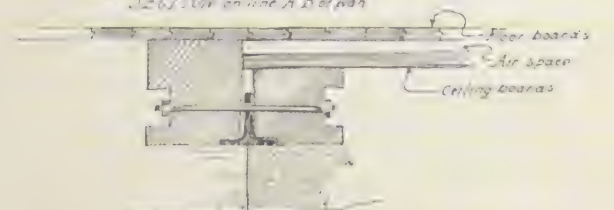
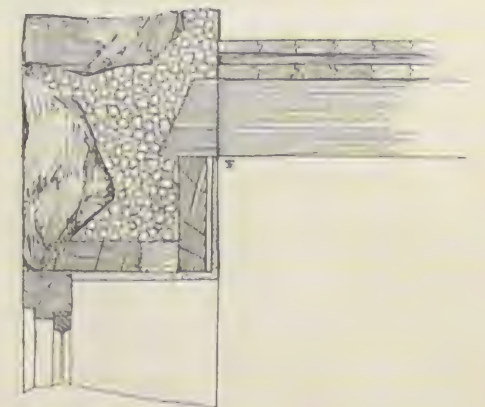


Fig 4



STANDARDIZATION

THE standardization of all parts which go to make up the completed house, so that the different kinds may be interchangeable among themselves, is a very important element of economy in building, and the module system of planning, as already pointed out, is a great help to that end.

The standardization of parts is a very different thing from the standardization of plans. By standardization of plans is here meant the use of the same design for a number of houses. Standardization makes for speed, convenience, and economy; but standardization of plans also produces monotony. Except under certain conditions, referred to later, the duplication of houses, which all look as if they came out of the same mold, is a thing to be avoided. It seems to indicate either woful poverty of invention on the part of the builder or a lack of interest in anything but the commercial side of his undertaking. Houses made in that way have no individuality and are reduced to the status of the manufactured article, turned out by machinery. Many attempts have been made to standardize houses and even to have molds in which they could be cast by the dozen or hundred, as occasion might require; but it is hard to think that taste can sink so low as to make that method popular. No matter how good the design may be, the continued repetition of it is deadly. To build in that way is like attempting to make a poem with but a single couplet. The couplet might be good, but the continued repetition of it would hardly be satisfying.

Standardization of the various parts which enter into the construction of houses, on the other hand, is a different matter; to do that does not lead to monotony, but to simplicity and repose. Just as one can make an indefinite variety of words by using the same twenty-six letters, so one can make an indefinite variety of houses, using standardized parts. Doors, windows, moldings, columns, beams, rafters, stairs, dressers, and all the other things that enter into the composition may be of uniform sizes and patterns, but combined in an indefinite variety of ways, and the same is true of building methods and processes. If a number of houses are to be built at the same time, it is much more economical and convenient to buy the things needed, or make them, in large quantities and use them interchangeably, than to make them up piecemeal after a variety of patterns. And even if there is but a single house to build, a considerable saving may be had by making similar parts uniform.

When parts are to be standardized, one can well afford to devote more time and care to their design than otherwise; in that case it pays to take great pains to eliminate waste which otherwise would be many times multiplied. When the parts of a house have been properly standardized, every feature will have been so designed and adjusted as to call for the use of stock sizes of materials, without cutting or waste. The sashes, for instance, will be arranged to receive panes of glass of commercial sizes, walls will be spaced to permit of the use of standard lengths of lumber, and so on. To do this will result not only in saving materials but time also, which, in these days of high wages, is quite as important.

The standardizing, if properly done, will be applied to every detail of the building no matter how small, and on every one something should be saved. All these little economies, which though they may seem trifling when considered separately, will amount to a great deal in the aggregate. Moreover, this careful study of the

parts saves trouble in erection, and in many ways expedites, simplifies, and improves the work.

In standardization the module system of planning is a powerful aid. In the first place, it is a great time-saver both in making the plans and in laying out the work. Then the fixed unit which pervades all parts and determines all measurements tends to eliminate those irregularities which constantly creep into plans made in the ordinary way, and for which special provision must be made by changing sizes of doors, windows, or other features, and making drawings which would otherwise be unnecessary; all of which causes the loss of time and money and involves additional care and trouble. The system is also a great aid in obtaining that symmetry and order which is a mark of careful planning and good workmanship, and which imparts to the completed structure the appearance of having been made by one who understood what he was about. For instance, if all beams and rafters are centered on the module, or, as in the case of these designs, on the module and half-module, all irregularities of spacing will be avoided and every beam will be placed symmetrically with respect to every other feature, which is a very important consideration where exposed beam ceilings are used, as in these houses. Without such a system, indeed, beam ceilings are an extravagance; while with it they are an economy.

As we have said, there are times when uniformity of design for houses built together is not objectionable; under certain circumstances, indeed, uniformity of design may be desirable and necessary; but these are cases where several houses are considered as a single feature in a general design, as when grouped about a square or in rows. When each house is to be considered by itself, it is entitled to its own individuality.

Plate 31

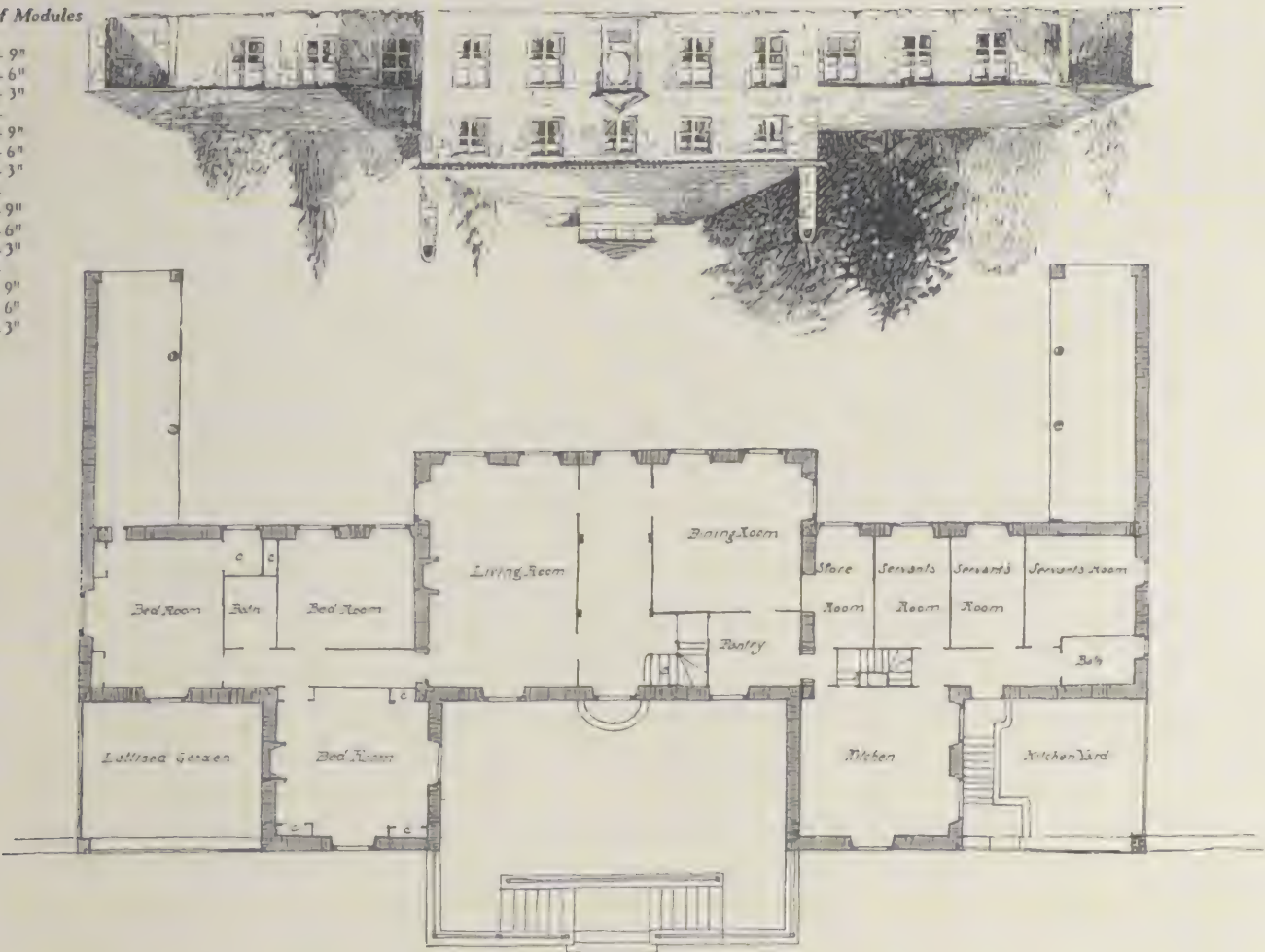
This house is larger than any other of those illustrated except No. 22. It is a revision of a smaller design and shows how easy it is to expand. Almost any of the other designs are capable of enlargement in the same way. Expansion and contraction of plans represent extravagance and economy, and it is always easy to be extravagant where the means permit.

The house borders the road on one side, from which a double flight of steps ascends to a small paved court preceding the main entrance. The hall extends entirely through the house without interruption, the stairs being in a recess at the side. There are six masters' bedrooms all told, three of which are on the ground floor, but most families would doubtless use one of these for some other purpose. The service department is entirely in the right wing of the building. As usual in most of these designs, the garden front is away from the road. There are a pair of verandahs which face each other, an arrangement which is convenient when means permit, because no matter how a verandah is arranged, there are times when one wishes it were different, and here there is a choice of opposites.

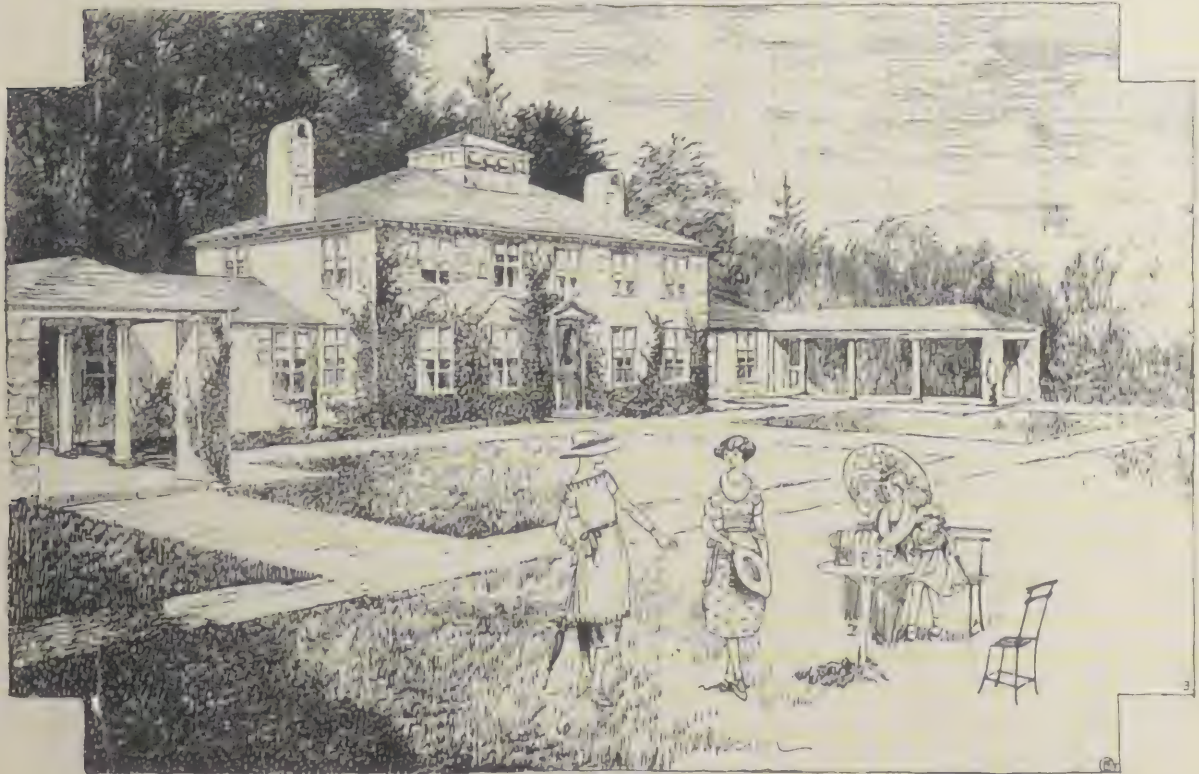
In the main part of the building the ridge-dormer takes the form of a cupola or monitor, having windows on all sides which can be left open without admitting rain, and thus permit of the escape of heated air from under the roof. The size of the monitor is not greater than the needs require. It is folly to make these things too small. If properly proportioned they will keep the house cool, but if too small are useless.

Table of Modules

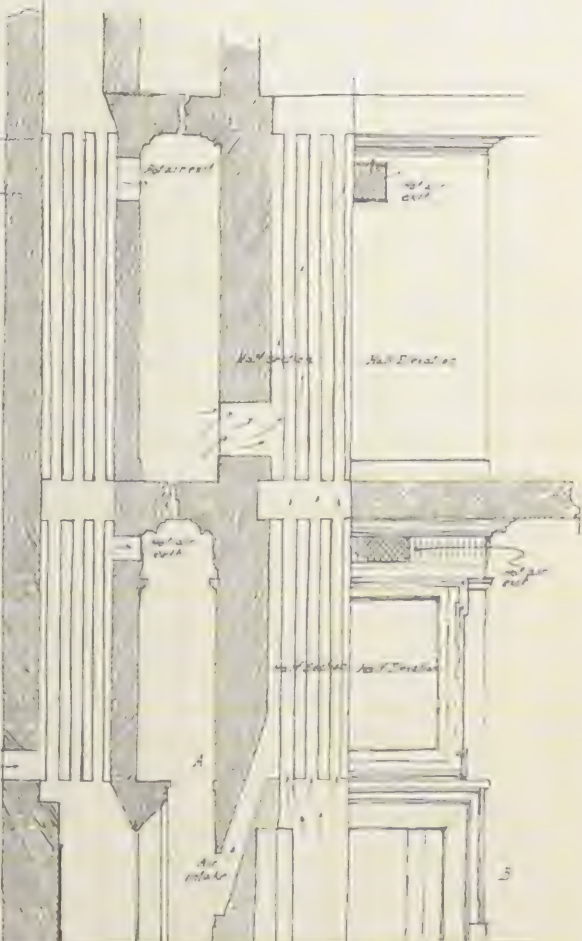
1	m	-	3'-9"
2	"	-	7'-6"
3	"	-	11'-3"
4	"	-	15'-
5	"	-	18'-9"
6	"	-	22'-6"
7	"	-	26'-3"
8	"	-	30'-
9	"	-	33'-9"
10	"	-	37'-6"
11	"	-	41'-3"
12	"	-	45'-
13	"	-	48'-9"
14	"	-	52'-6"
15	"	-	56'-3"



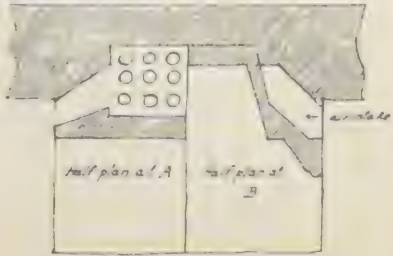
Plan of upper floor



First floor inside from outside



Section of house 4th floor



ARTISTIC CONVENTION

CONVENTION is the most powerful agent in art. It is the basis on which the artist stands and from which he commences his work. It may be called the standardization of taste, representing the best judgment of the time. Every one is free to improve upon or change it. If the change is generally accepted, it becomes a part of the convention. Convention is therefore the embodiment or crystallization of the combined artistic judgment or taste of the time; founded upon all that has preceded it—the outcome of an evolution extending back through the ages.

The classic orders of architecture are the Greek conventionalization of post and lintel construction. The forms of buildings and of all parts which compose them are governed largely by convention. At its apogee all branches of Greek art were highly conventionalized. It is evident that the quality of the art of any epoch must depend chiefly upon the quality of the artistic convention of the time, *i. e.*, upon the standardized taste which the conventionalized forms and methods represent. Those forms and methods are at the free disposal of the artist, and it is manifest that one who uses them has a great advantage, because, by so doing, he avails himself of the resultant of previous effort.

Like most other things good in themselves, convention is capable of abuse. It may be carried too far, as one sees it in Egyptian art; or not far enough, as one sees it in much modern art. When overdone it leads to dry formalism, and when underdone to vulgar realism.

Few things in nature are perfect, though all about us there exist the germs of perfection or beauty. It is for the eye of the artist to discern, his mind to analyze, and his hand to extract and present to view the substance shorn of all dross and concealment. This can best be done by united effort, the product of which is conventionalized forms.

The photographic representation simply reflects nature and does not go below the surface. It does not interpret. It may present the germs of beauty just as nature presents them, but does not clear away the non-essentials so that the spirit or essence may shine forth. Herein art is superior to nature.

In interpreting nature it is not necessary, nor perhaps possible, for the artist to adhere closely to the model from which he draws inspiration. The divergence may, indeed, be very wide. The thing becomes conventionalized. For instance, take the horses' heads of the pediment of the Parthenon at Athens. Did any one ever see their like in nature? Yet do they not represent the very spirit of the horse, exalted and glorified? They are horses for the gods, and works of art of the first order. This same quality is found everywhere in the best Greek art, both in animate and inanimate representations. In conventionalizing an object in nature, the essential elements of its beauty are seized and may be emphasized by repetition, as in the anthemion of the Erechtheum. The columns of the Greek Doric temple embody the very spirit of support. With majestic strength they combine grace and refinement of line, and delicacy and beauty of contour, only equaled in the most perfect human forms. So, too, in all other parts; from the silhouette of the mass to the most minute detail of profile or sculptured foliage one sees the very essence of beauty. They are a collective product in which all is conventionalized and simplified, so that only the essen-

tials remain. The result is sublimely monumental. It is a result only in part due to the individual, being mainly dependent on artistic convention representing the combined taste and wisdom of the time and place.

In the best Greek statuary this conventional idealism is found in greatest perfection. There is little that is photographic about it. The statues do not represent any one in particular, but do represent the very essence of human beauty. They are idealistic, collective, and composite. They embody the essence of beauty in the human form just as the horses' heads above referred to embody the essence of beauty in the horse, and are superior to nature in that respect.

Such art is elevating, grand, majestic, dignified, and sublime. The bizarre and frivolous have no place in it, nor has the realistic. Its foundation is beauty. All that it touches is simplified and dignified. (Witness the sculptures of the rostrum of the Roman Forum.)

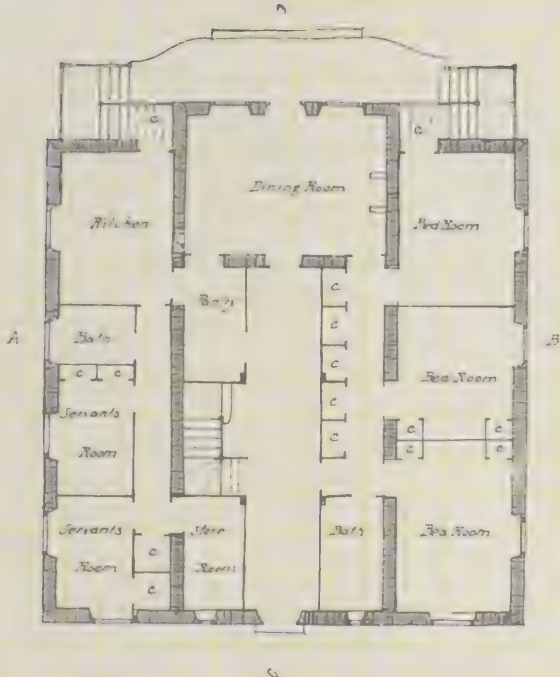
Since the time of the ancient Greeks the world has seen too little of that kind of art. Conventionalism is less pronounced and individualism more so. But this does not mean that subsequent art has not often sought and found the spirit of the thing represented. Great artists of all times have done so. Where they differ chiefly from the Greeks is in their appreciation of beauty. Greek art reveals the essence of beauty in nature, both in spirit and in form. The Greeks saw with finer feelings than were ever used before or than have been used since, and did better team-work, as the modern saying is.

In much mediæval art one sees the spirit revealed with Greek distinctness, but without the Greek appreciation of beauty of form. Consider the best examples of Gothic statuary, for instance. Are they not often the very personification of the thought and aspirations of the time, and absolutely at one with the architecture? As much so as ever was the work of Greek, and like Greek art they are chiefly the product of conventionalism. Who ever saw such figures in life? They often possess hardly more than a mere semblance of the human form, yet represent with great beauty of feeling the very essence of mediævalism, and have about them dignity and refinement to a degree seldom found where nature is baldly depicted. Those curious saints and personages are not portraits of individuals; they go far beyond that. They portray the spirit of an age. They belong to monumental art. On the south porch of the Cathedral of Chartres are figures of almost Grecian mold. Portraiture of this sort is collective, majestic, and grand. The step from it to the photographic is like the step from refinement to vulgarity. The two things do not belong together. They are of different worlds. The one is monumental, dealing with the spirit, and the other commonplace—earthly.

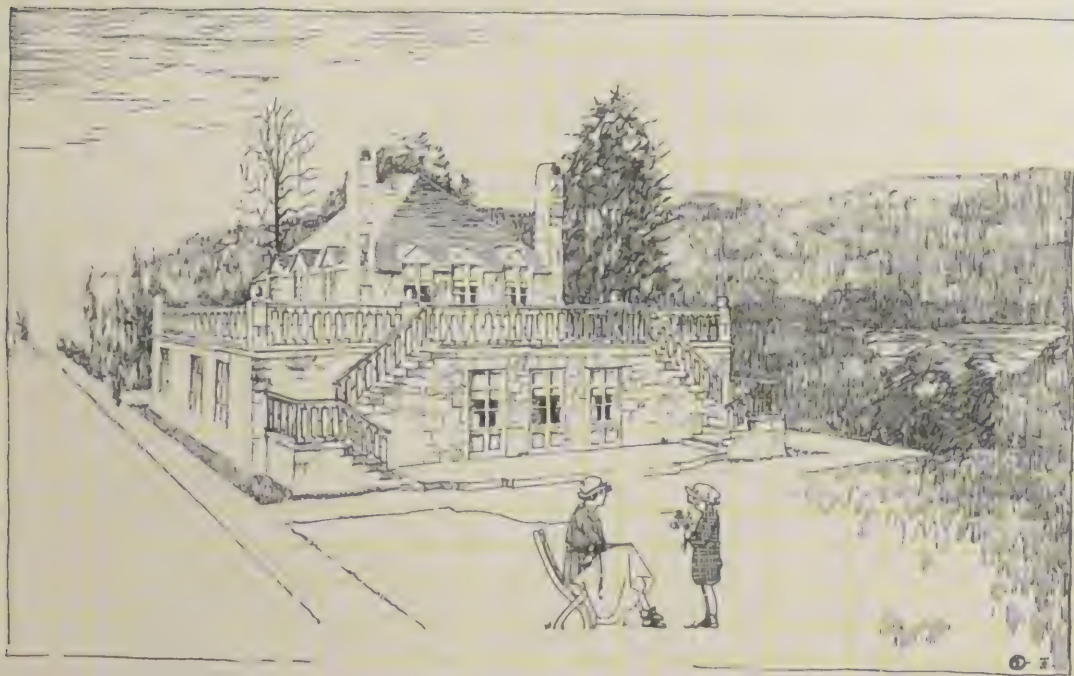
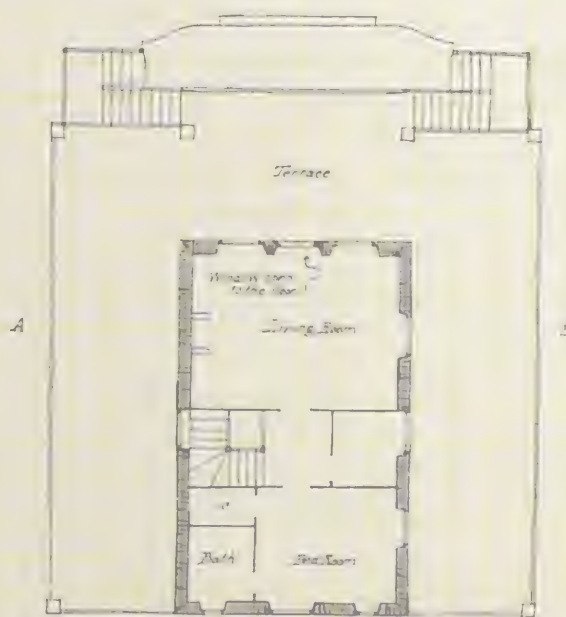
Consider the statue, a photograph of which is herewith given. It was erected on Staten Island not so very far from the site of the little houses the subject of this work. It is intended as a monument to the youth of Staten Island who took part in the war, but how pitifully does it fall short of the mark. The idea to be commemorated was lofty. The sculptor could have had no finer theme. His task was to present the spirit which animated those young men who obeyed the call to arms, and among them many who died in defense of their native land. There could be no more inspiring or majestic

Table of Modules

1 m	=	3'-9"
2 "	=	7'-6"
3 "	=	11'-3"
4 "	=	15'-0"
5 "	=	18'-9"
6 "	=	22'-6"
7 "	=	26'-3"
8 "	=	30'-0"
9 "	=	33'-9"
10 "	=	37'-6"
11 "	=	41'-3"
12 "	=	45'-0"
13 "	=	48'-9"
14 "	=	52'-6"
15 "	=	56'-3"



Section on line C-C of plan



SMALL HOUSES

subject. The idea was collective, but this realistic figure simply represents one man. It is a bald representation of the surface in nature. It does not reveal the spirit. An absolute mold of almost any individual soldier would have done quite as well. To treat the subject that way is hardly less than an insult to the men it is intended to honor, though, of course, the motive was good. The fault lies in ignorance. Work calling for the talent of a Manship was entrusted to a mere maker of images, with the result always to be expected in such a case.

The question now naturally arises as to what bearing this mysterious quality may have on the designing of houses. How can the very spirit of the home be imparted to the appearance of the house by convention? It seems to the writer that there are at least two ways to do so, both of a somewhat similar nature—one to reduce height, and the other to conform to the topography of site. A low building hugging tight, as it were, to Mother Earth almost always has about it an air of comfort and a suggestion of shelter which a taller one, exposed as it is to the buffeting of the elements, cannot possess in the same degree. So, too, a building which seems fitted to its site has about it an air of belonging to the land and holding a legitimate place in the landscape which one designed to be placed anywhere cannot have. The building which seems to be indigenous to the soil bears about it a stamp of permanence, suggestive of the homestead; a structure rooted in the soil, so to speak, and appropriate to long continuance of family life. These two attributes are

of the very essence of the idea of home. Like most other high qualities, they are not costly. They are expressed by the disposition and shape of the building, and depend not in the least degree on elaboration or ornament; but they do require artistic feeling on the part of the designer. He must be acquainted with the true principles of design and know how to apply them; but are not these requisites in the production of any work of art? To produce it one must be an artist.

Plate 32

Here is a design which some may think altogether a thing of fantasy, but it embodies an idea worth considering. It belongs in a class with No. 12. In that design both living-room and dining-room are on the first floor, while in this one the dining-room is on the ground floor with the kitchen, which simplifies service. This house, too, has one of the bedrooms on the first floor, which some might think an improvement.

The terrace, formed by the roof of the lower story, with its double flight of steps to the garden, would prove as attractive as it is unusual. In the living-room the central window opens down to the floor, giving access to the terrace, which extends on three sides of this story. On the ground floor the entrance-corridor is more liberal than in most of these plans, but its spacious effect would be fine. Here, as in most of the other plans, the service department is well separated from the rest of the house.



No. 34
Dire result of realism. Soldiers' Monument,
Staten Island.

DORMERS

DORMERS are so much used in these designs that it is important to know how to build them economically. The layman is usually not much interested in technical details of this sort; but when about to build he is generally interested in reducing costs, and matters otherwise uninteresting become so on that account. A study of the various details illustrating this work should result in considerable savings over ordinary methods of building, and dormer construction is an important item in the list. The ordinary way of making dormers is to build a framework and case it in; which, in comparison with what we have here, is an expensive and laborious operation.

These dormers are extremely simple, made with less than half the wood usually required, and a corresponding reduction in labor. Everywhere in these designs the aim has been to discard all superfluities and reduce the work to the simplest form. Here, as elsewhere, therefore, casing is eliminated and the constructive members shown, they themselves forming the finished product. The window-frames are run out of the solid; jambs, sills, and lintels being plowed to receive the sashes; the governing principle being the same as used for the other windows (see Part XII).

These dormers are peculiar, in that they have sashes at the sides as well as on the face, as illustrated in Figure 5. The side-sashes greatly increase the light and add much both to the usefulness and beauty of the window, especially from the inside, making it seem open and doing entirely away with that shut-in, tunnel-like appearance characteristic of most dormer-windows. Of course the arrangement adds much to the cheerfulness of the room. One who had never seen a dormer built in this way would be astonished at the improvement it presents over other dormers of his acquaintance. It will be noticed in the section of the jamb (see Figure 1) that there is a groove to receive this side-sash, and also a corresponding groove at the head (Figure 4). These side-sashes do not open but are fixed in place permanently. They can be cleaned from the inside, by reaching around, after opening the main sashes and fly-screen. On the other windows the fly-screens are attached to the window-frames and are immovable, as explained in Part XII, on Windows, but in dormers having side-sashes the screens have frames which are movable to permit of washing the glass. The way this is arranged can be seen in the section of the head of the frame (see Figure 7). The bottom of the side-sash when it meets the roof is flashed following the dotted line on Figure 5.

The reason for describing all this in such detail is on account

of the novelty of the construction. Contractors are generally very ready to think that new methods cannot be used unless one is well prepared to show them why they can be used.

It will be noticed on Figure 6 that the ceilings of these dormers are not flat but, like those of the rooms, follow the slopes of the roof. The dormers are so small that no framing is necessary; a 2" x 2" piece at the ridge, to which are nailed the roof-boards, is all that is required. The roof-covering is, of course, of the same kind used for the main roofs, and described in Part XV.

Dormers are useful in breaking up and enlivening the appearance of buildings, and especially so in designs like these, where dependence for beauty is placed almost entirely upon pleasing outline.

Besides breaking up the lines and relieving them of that hard dryness so characteristic of designs where baldness or poverty are mistaken for simplicity, the dormers, in common with chimneys, gables, etc., may be used to obtain picturesqueness and interest. They are, therefore, extremely useful to the designer who is limited in his resources by economic considerations.

Plate 33

In this design the central part of the house has but a single story, while the wings each have two stories. The left wing is given over entirely to the dining-room and the service department, and the right wing to the bedrooms of the family. Each wing has its own staircase. The plan is compact, but the octagonal ends of the two wings provide great variety of exposure for the rooms.

The living-room is lighted on one side only, but has a large area of glass on that side, and is also provided with ridge-dormers. A small detached shelter in the form of a kiosk is substituted for the usual verandah (see Part XLIX, on Outdoor Shelters).

The location for the building is on sloping land, a condition which has been taken advantage of to supply a low terrace at either side, which, though scarcely more than a bank of earth with a balustrade at the edge, adds greatly to the dignity and importance of the design. In this house the ceilings of the upper story do not extend all the way up into the roof as usual, but are cut off at about 8' above the floor by a flat ceiling having perforated openings through which air from the rooms may pass into the space above, ventilated by the ridge-dormers. This same arrangement is used in several of the other designs in places where the height of ceiling would otherwise be too great.

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"

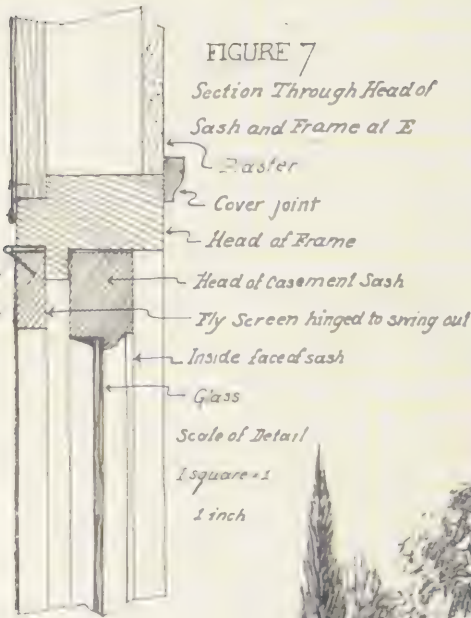
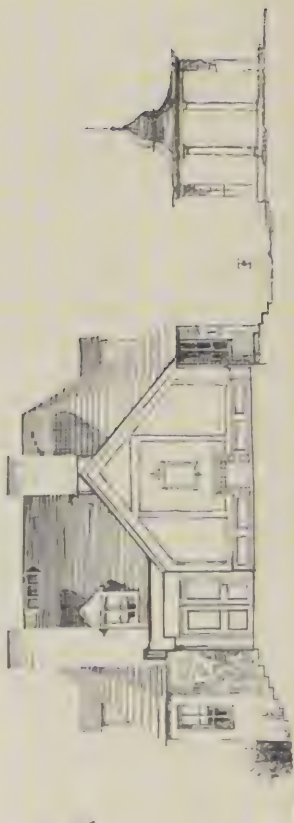
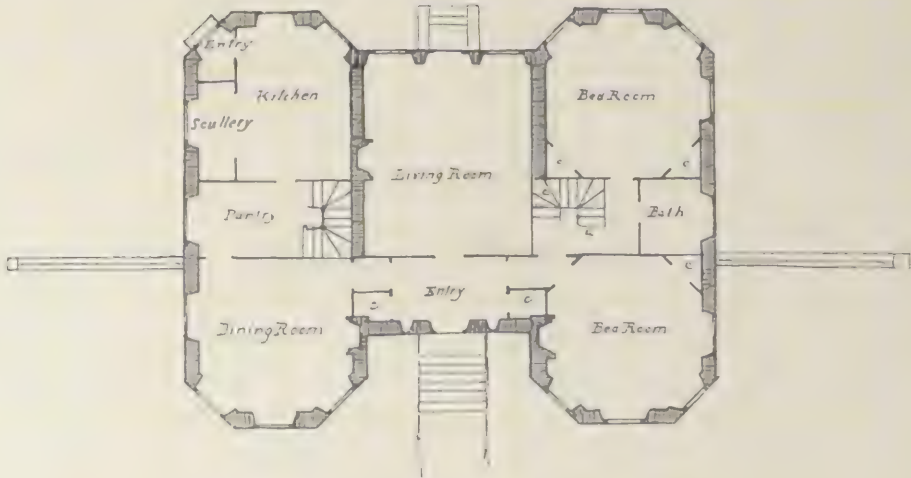
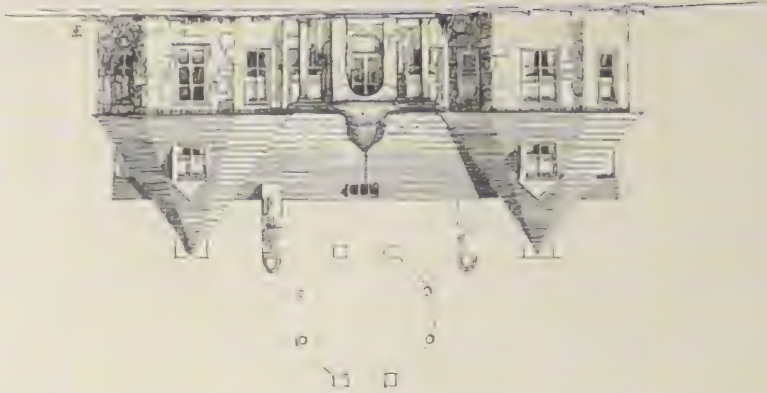


FIGURE 7
Section Through Head of
Sash and Frame at E
Raster
Cover joint
Head of Frame
Head of Casement Sash
Fly Screen hinged to swing out
Inside face of sash
Glass
Scale of Detail
1 square = 1
1 inch

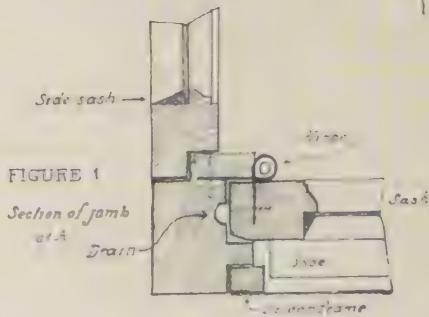
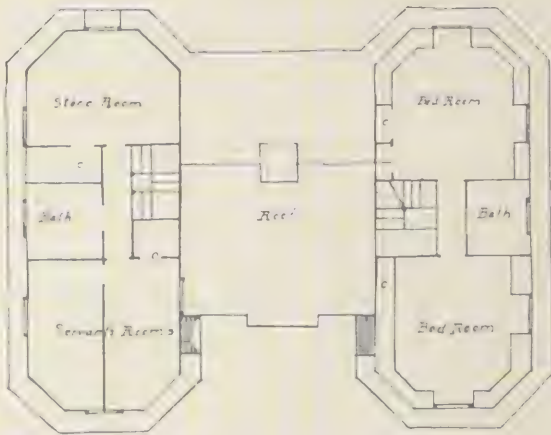


FIGURE 1
Section of jamb
at A
Sash
Drain
Jamb

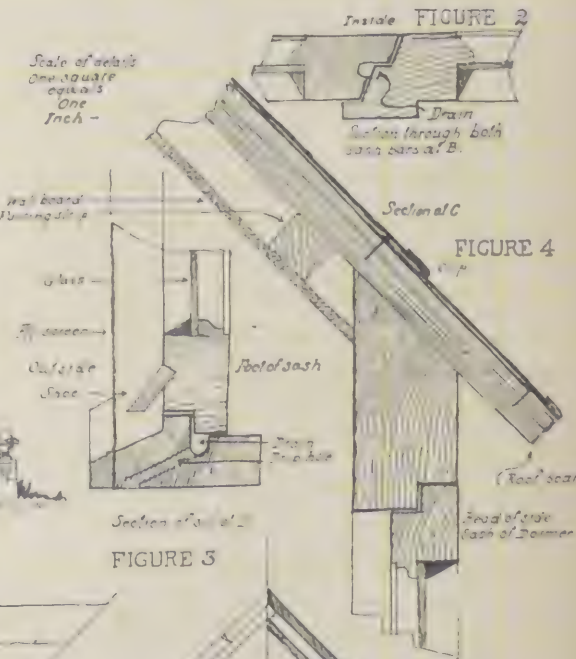
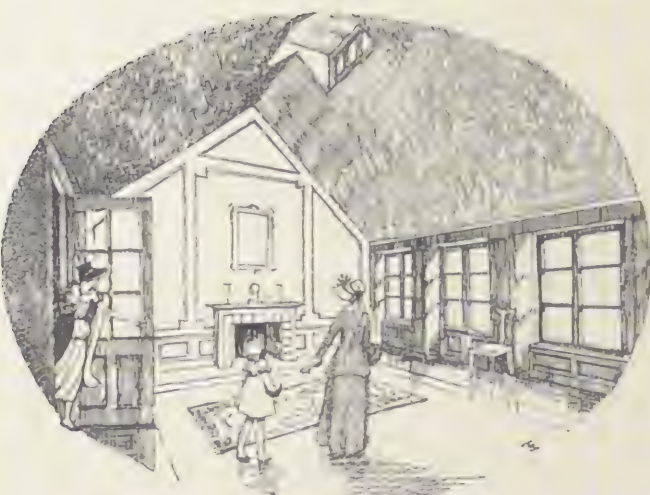


FIGURE 2
Section through both
sash cars at B
FIGURE 4
Section of C
FIGURE 3
Section of A at 2



Perspective View of Living Room

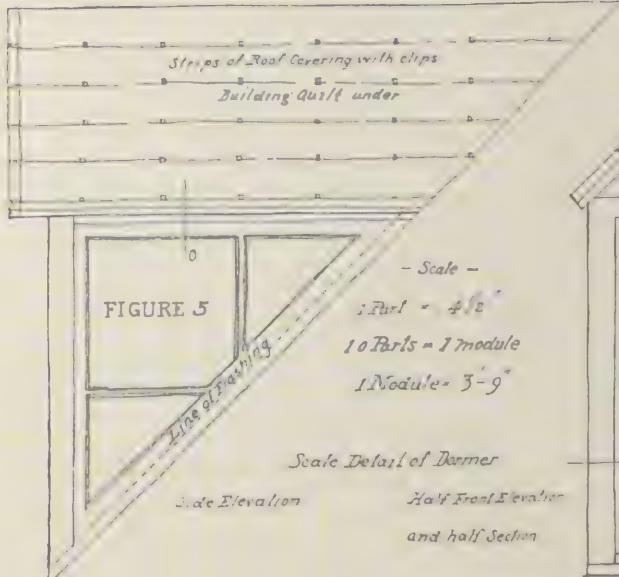


FIGURE 5
Side Elevation
Scale -
1 Part = 4'-8"
10 Parts = 1 module
1 Module = 3'-9"
Scale Detail of Dormer
Half Front Elevation
and half Section

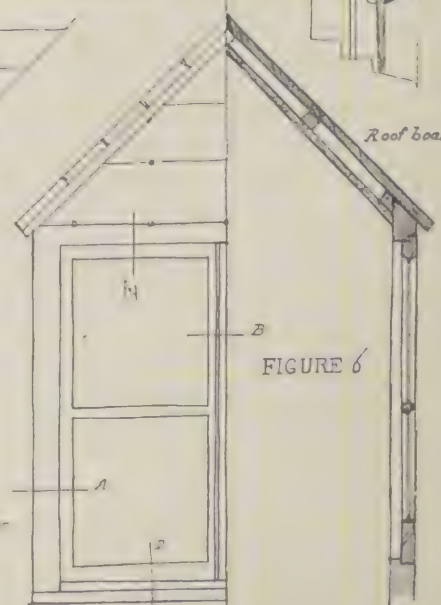


FIGURE 6
Half Front Elevation
and half Section

DECORATION

THERE are few branches of design, unless it be planning, about which so many people feel qualified to speak as house decoration. Women are particularly prone to this belief, and seldom hesitate to render confident judgment. Many persons who have little or no knowledge of the principles of design feel that their instinct or innate taste is a sufficient guide, and it naturally follows that the less their qualifications really are, the more confidence they have in the correctness of their opinions, because being ignorant of the fundamental principles of good taste, they have no standard by which to judge the value of their own taste. With many such it is useless to argue; they know what they like, and that is all there is about it; but there are some whose minds are open on the subject, and to them we address ourselves.

Under ordinary circumstances, in decorating the house, there are so many limiting conditions that great success can seldom be hoped for; but many common mistakes may easily be avoided and much better results than usual obtained by the use of faculties which every one is supposed to possess, but which few seem to realize are applicable to decoration.

In decorating the house, people are often hampered in many ways. They may have ugly furniture which they do not want to discard; they may lack the means to do what they would like to do; the house itself may be poorly designed, or other obstacles, over which they have no control, may stand in the way of a good result; but for the present purposes we will suppose no such hindrances to exist in the decoration of one of these small houses.

The first and most important thing to do is to have well in mind the correct aim, which is, of course, to produce, as far as decoration is concerned, a pleasant environment in which to live. Everything which tends toward that end will be a move in the right direction, and everything which cannot be so regarded, a step lost.

A pleasant interior is a cheerful interior, and a cheerful interior depends largely upon an abundance of light; light may be excluded when not desired, but cannot be admitted unless provision has been made for it.

A pleasant interior is also largely dependent on comfort—comfort for the body and comfort for the mind. Comfort for the body requires comfortable furniture, and utensils, of all kinds, fitted to their uses. Comfort for the mind requires pleasurable sensations, such as may be excited by harmony and the other elements of beauty, in everything which meets the eye.

Extremes should be avoided; the rooms should neither appear crowded nor bare. Often a single piece of furniture too much will impart a cluttered appearance and ruin what might otherwise have been a good effect. Also too little furniture will generally make a room look cheerless and unlivable. Everything should be fitting, not only for use, but to the circumstances and mode of life of the user, and should reflect his individuality and refinement.

Suitable furniture has much to do with one's pleasure in life. If agreeable to the eye and comfortable for use, it will go far toward making the house pleasant to live in.

Great care should be used in the selection of furniture. Once acquired, an unfortunate object is apt to stick. Many an otherwise agreeable interior is spoiled by some hideous piece of furniture, or ornament so called, acquired long since or handed down in the

family. Such things are often kept on account of associations; but association with ugliness is undesirable. Ugly things should be disposed of, but in so doing care should be taken not to mistake fashion for beauty. Things which are intrinsically good are often discarded because they are out of fashion. How many families have lost articles which they would now regard as priceless, on this account. My own has suffered not a little in that way. Among other things, a table at which Washington, Sumter, and Marion had dined at the home of my great-grandfather, Surgeon-General Henry Collins Flagg, of the Continental army, first had its ball-and-claw feet cut off and casters substituted, as being more *à la mode* at the time, and at a later date, with several other pieces of almost equal value as heir-looms, was disposed of to make way for the ugly black-walnut furniture then in vogue.

While nothing here recommended may seem very difficult of accomplishment, where the means are sufficient, yet failure occurs more often than success.

Success is dependent upon the use of reason, and reason, as a rule, is a commodity very sparingly used in house decoration. No one will contend that the decorations of a house should be inappropriate, yet with many to make them so seems to be the cardinal principle of their theory. Decorative effects suitable to the hut of a peasant are affected by people of condition. Many who would not wish to be thought lacking in refinement exhibit the taste of the barbarian when it comes to decorating the place where they are to spend most of their time. Some show a preference for rudeness over refinement in finish; some even mistake coarseness and poor workmanship for art. Others seem imbued with the notion that a more artistic result may be had if the decoration and furniture represent any other period in history than the present; many have a leaning toward monasticism and delight in surrounding themselves with objects rifled from old religious houses, then see nothing comic in the results obtained. There are people who make so slight a draft on their common sense, where taste is concerned, as to mistake age for beauty. If a thing is old they think it beautiful, and go into raptures over objects which their reason, if given half a chance, would condemn as of extraordinary ugliness.

In house decoration, as in everything else, affectation is abhorrent to good taste. Affectation comes often with what may be called the museum effect—where the furniture and decorations appear to be on parade, and there is a general atmosphere of conscious high art.

Archæological exactness is the stock in trade of the professional decorator. He acquires a superficial knowledge of certain old fashions, then poses as an expert, and charges accordingly. This is not intended as a criticism. With him it is legitimate business, and the professional decorator is avowedly a man of business.

Archæological exactness does not necessarily mean harmony, and harmony, not archæology, is an essential of good taste in decoration.

The introduction of the ridge-dormer opens a new and interesting field for decoration. When the ceilings follow the slopes of the roof, the decorative problem takes on a new aspect. The most satisfactory way of dealing with it, which the writer has been able to devise, is to panel the vertical wall surfaces. Paneling is a very reasonable form of decoration, because it combines both form and color. The agreeable shapes and proportions given to the panels

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is an element of decoration which would, in itself, be sufficient to impart an ornamental character to the room, but when combined with proper coloration the result should be doubly pleasing.

Paneling is not essentially an expensive process. Very good effects may be obtained by simply nailing wooden moldings to the plaster. The solid, thin, plaster partitions, as used in these houses, are particularly well suited for the purpose, as nails have a very good hold on them.

Plate 34

The peculiar feature of this design is the diminutive court in the center of the plan. This little court lights the pantry, bath-rooms, and passage; but its most important function is to provide drainage for the interior slopes of the roofs.

The house has but a single story; it is therefore most important that its various departments should be distinctly segregated, and the plan leaves little to be desired in that respect. The living-rooms and entry occupy the whole front of the building; back of them, to the right, is the service department, and to the left the bedrooms for the family.

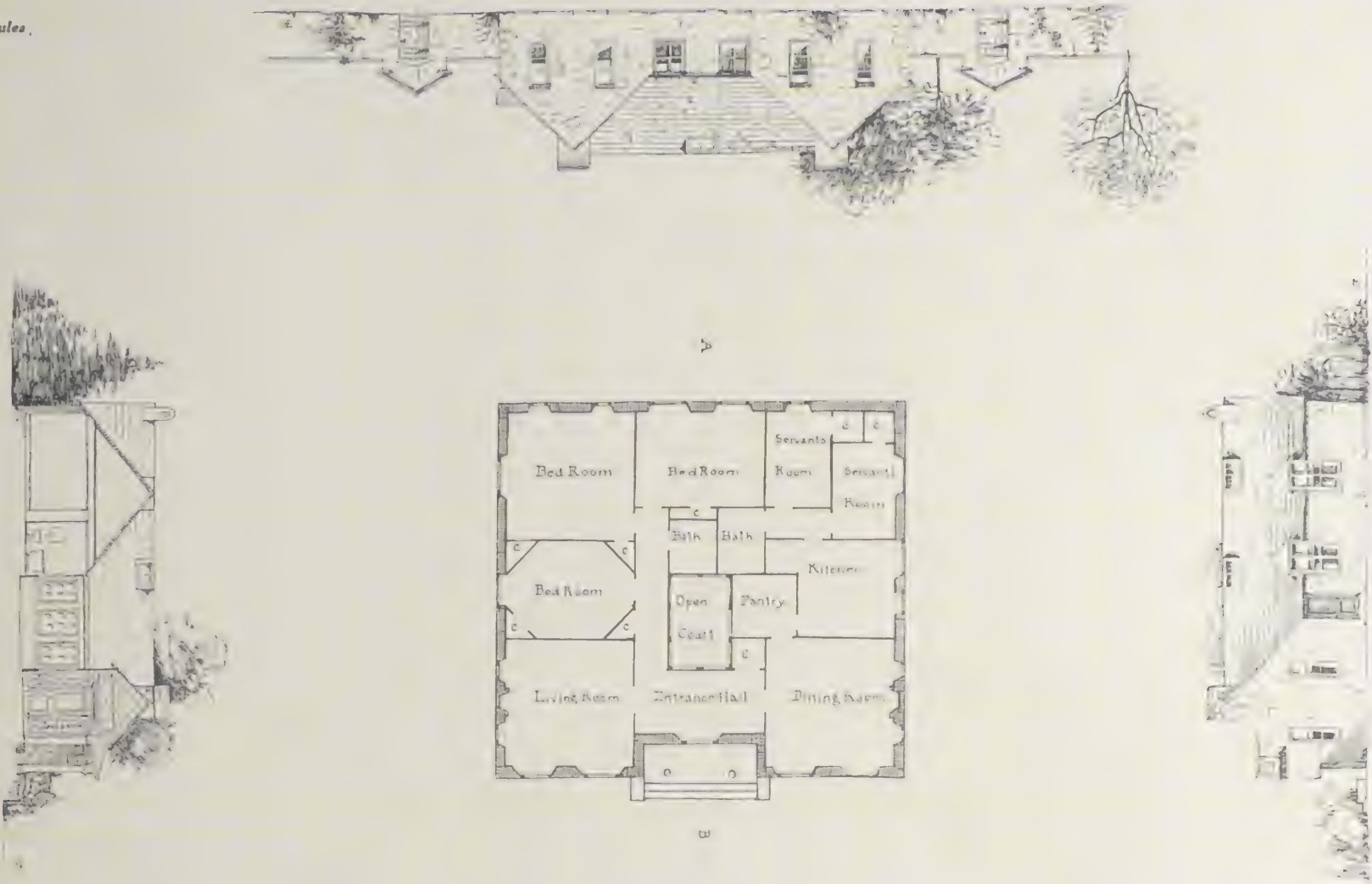
The perspective view from the entry shows windows into the small central court.

Except for the shallow porch at the front, no outdoor shelter is indicated, but one, or even two, might easily be added back of the enclosure wall near the front.

The house is intended to stand on a little place of its own, to which two converging streets lead. The design of Plate 28 is supposed to be located on one of them.

Table of Modules.

1 m	= 3'-9"
2 "	= 7'-6"
3 "	= 11'-3"
4 "	= 15'-0"
5 "	= 18'-9"
6 "	= 22'-6"
7 "	= 26'-3"
8 "	= 30'-0"
9 "	= 33'-9"
10 "	= 37'-6"
11 "	= 41'-3"
12 "	= 45'-0"
13 "	= 48'-9"
14 "	= 52'-6"
15 "	= 56'-3"



ORNAMENT

IN designing the house, or anything else for that matter, simplicity is to be preferred to complexity; but simplicity does not mean dryness. A design may be very simple, yet rich also. No building ever designed, for instance, was more simple and restful in its majestic dignity than the Parthenon at Athens; yet none was ever more richly decorated or more elaborately refined in its every detail. The Parthenon presents a combination of masculine power with the most subtle and exquisite beauty of detail. In every line breathes strength and repose; but it is the strength of the gentleman, not of the boor or savage. Many people profess a distaste for all kinds of ornament under the mistaken notion that ornament is inconsistent with simplicity; but it depends upon the kind of ornament and the way it is applied as to whether the result be simple or not. To get the full value of ornament, there must be contrast and accent. Plain surfaces must act as foils for rich surfaces. A thing over-ornamented is gaudy, not rich; or, if it may be called rich, the richness is barbaric. By unstudied profusion the value of ornament is lost—it loses its value by its very abundance. On the other hand, hard lines and the lack of ornament may perhaps produce simplicity, but not artistic simplicity. Things so designed are cold, dry, and uninteresting.

It may seem a long cry from the Parthenon to the small house, but the eternal principles of design are the same in both cases. A well-proportioned cottage may be a work of art, and an ill-designed palace far from it. In the small house, cost is generally a necessary consideration. It is therefore highly important that what money is spent on ornament should produce the most telling effect. If in the general composition the principles of good design are followed the building will be ornamental almost without the use of decorative detail, and further ornament, if applied, should simply serve to heighten and intensify the fine effect.

One of the chief purposes of ornament is the avoidance of dryness, which comes with the use of hard, unbroken lines. The Greeks thoroughly understood this and broke up and softened the long, straight exterior lines of their temples by the use of sculpture, richly carved acroteria, antefixes, water-spouts, etc. These were essential features of the design, and their absence in modern imitations of those buildings is a very grave defect. This is illustrated in many of the so-called Greek buildings which were erected here in the early part of the last century, as, for instance, several of the public buildings at Washington, the Sub-Treasury on Wall Street, New York, and others throughout the older cities. Although the general proportions of these buildings may be fine, their silhouettes are cold, heavy, dry, and hard, because an essential quality of Greek design is missing.

Some years ago the ornamental trophies of the parapet which decorated the Palace of Versailles became dilapidated and were removed, with the result that the building appeared heavy and dull. The French were quick to perceive this error; the ornaments have now been replaced and the original beauty restored. It is therefore a great mistake to dispense with ornament where ornament is needed.

In the small house straight lines are not usually very long, and

what there are can generally be sufficiently softened by chimneys, dormers, and other features; but when this cannot be done, ornaments should most certainly be used. In many old Colonial houses, railings, balustrades, and cupolas were employed for this purpose, as one sees them at Mt. Vernon. The most common, the least expensive, and one of the most effective ways of imparting richness to the small house is by the use of moldings. These, when properly profiled, may be made extremely effective in supplying an air of elegance, finish, and refinement to the building; but when not properly profiled they act in a contrary fashion, making it appear coarse and vulgar, and it is here that the modern counterfeit Colonial work differs sharply from the genuine, the modern moldings, for the most part, being profiled as if they were to be cut from stone, and shock one's sense of propriety or fitness.

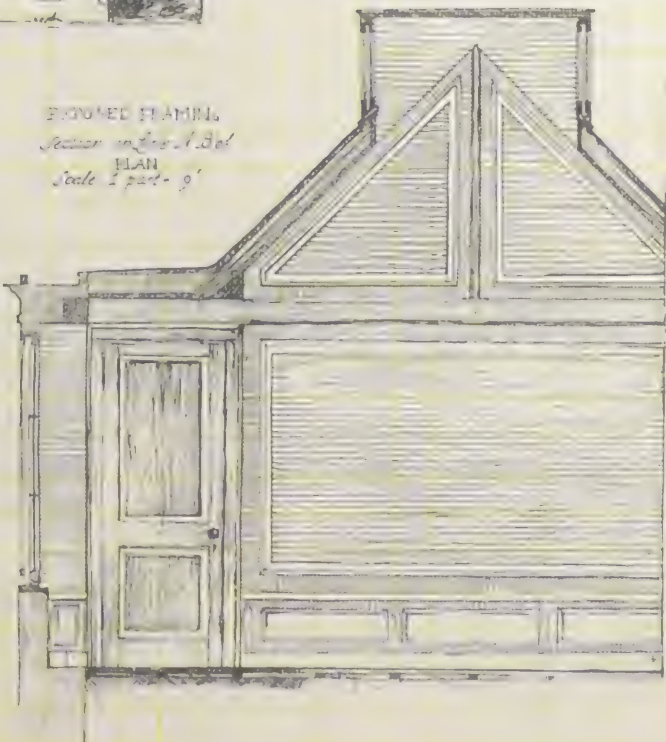
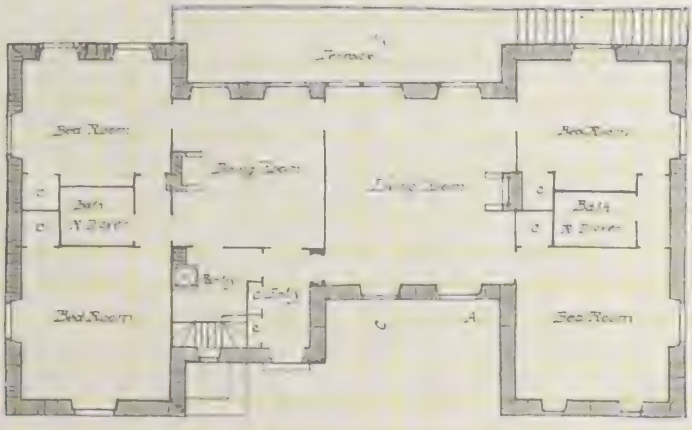
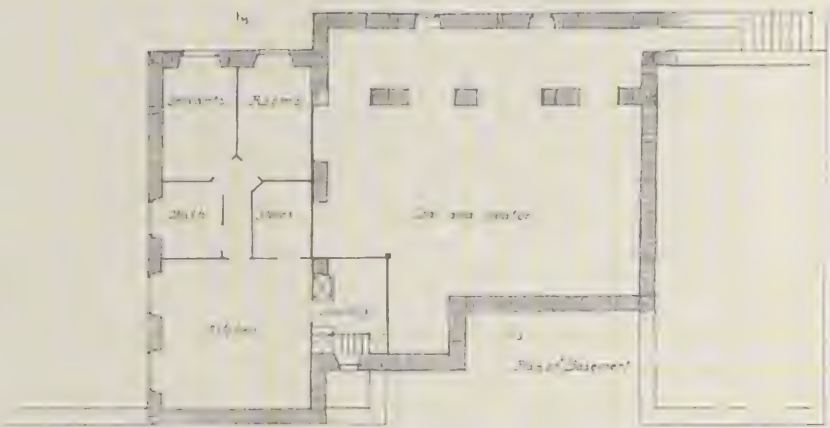
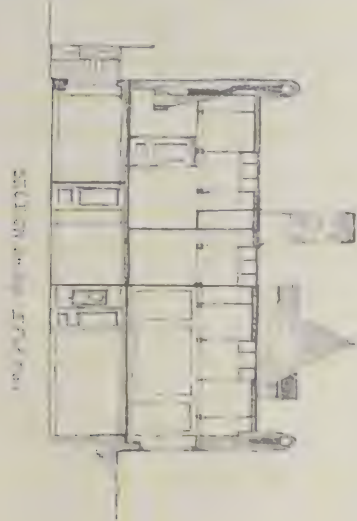
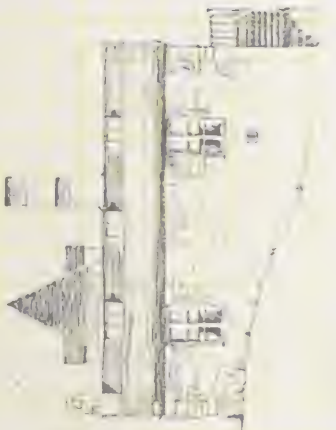
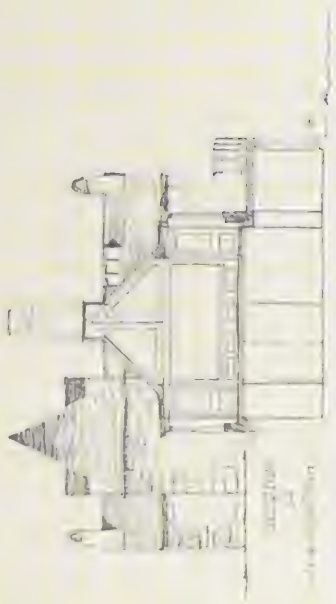
Poorly designed ornament on buildings is a costly ill, alike offensive to good taste and an infliction on passers, who are compelled to see it or else keep their eyes shut. Is it not extraordinary for what abominable things people will spend good money, and often in large amounts! Surely there should be some sort of censorship over things placed on public view, and from which there is no escape. The individual should not be allowed to debase public taste by compelling familiarity with ugliness and vulgarity; but sad and disastrous as such exhibitions are, they have one redeeming virtue in that they may be considered as mistaken efforts to please, and even their distressing presence is better than the evident lack of any such feeling on the part of the builder. In London there are streets, in very respectable neighborhoods, too, where the houses, or at least all that can be seen of them, consist solely of a grimy brick wall, with openings for windows and doors, but with no other relief, projection, or ornament of any kind or description. In no other place on earth, so far as the writer knows, are buildings so unpleasant of aspect to be found. They leave an indelible impression on the mind of sordid ugliness and lack of any human quality except that of meanness.

Correct ornament is a precious thing. If the "ornament" is not beautiful and does not beautify, it is not ornament, but a useless excrescence and a costly waste of effort. If it is ugly or disfigures what it was intended to beautify, the case is still worse, and how often is this latter result to be seen!

To fulfil its proper function, the ornament should soften, add interest, beauty, refinement, and grace to the thing ornamented. If it does not do so, its absence is far better than its presence. Any object worthy of being designed is worthy of a good design, and if the design is good, its simple form or outline without other embellishment should be pleasing; but the beauty of most objects may be increased or intensified by ornament. A striking illustration of the truth of this may be seen in the sculptures of the rostrum of the Roman Forum. Here are three animals—a bull, a sheep, and a hog. They are conventionalized so as to present the very spirit of beauty in their several species. They are monumental figures of great simplicity and dignity, and would be beautiful without any embellishment; but their beauty is certainly increased by the decoration applied. Of all objects in nature, man, of the most

Table of Modules

1 m	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-0"
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-0"
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-0"
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



ROOFED PLANNING
Section on line A-B
PLAN
Scale 1 part = 9'

SMALL HOUSES

perfect mold, rises superior to the need of adornment; his whole form and every member is of the very essence of ornament, as the Greek sculptor well understood when he carved the Olympian Hermes.

Plate 35

The plan of this house is largely influenced by the topography of its site; but the conditions are very common. The land falls away at the rear and is comparatively level in front.

The sloping bank, on which the house stands, brings the lowest story pretty well out of ground, and completely so for about half

its extent. Advantage of this condition has been taken to place the kitchen and servants' rooms in the basement. The main entrance and pantry occupy the ground floor of a small tower which contains a store-room on its upper floor. The dining-room and living-room occupy the central part of the building, while at each end are two bed-rooms and a bath-room. Both living-room and dining-room give upon a terrace overlooking the ocean. The roofs are of the combination beam-and-truss type, which results in reducing the height of the gable ends. This form of roof, with its exposed beam and post, might be objected to by some, and one of different type could be substituted for it.

HARDWARE

MANY articles of hardware, as made in this country, are defective in design, and none more so than ordinary door furniture.

Even in hardware of the best class the knob-spindle is a problem which seems too much for the manufacturers. Door-handles become loose and wobbly soon after installation, and always remain so, though the defect could easily be cured at little or no expense by threading the spindle, as foreign manufacturers do it. When lever handles are used they droop like the hearing apparatus of a lop-eared rabbit, simply because no manufacturer has the art, or will take the trouble to give the spring the one turn necessary to supply power to hold the handle up, and which the foreign-made article always has. Door-butts are defective because the pins work up, if loose, and it is hard to dismount the door if they are not loose. They are expensive to install, and, because the leaves are exposed, soon become shabby and rust unless made of bronze or brass, and, if made of bronze or brass, require constant polishing to look well. The list of easily remediable defects in American hardware might be greatly extended, but the chief items of interest here are those mentioned.

In several of the detail drawings which accompany these designs, it will be seen that a kind of hinge is used which is practically unknown in this country, although it is, and has been, in use for centuries throughout a very large part of the civilized world. It has certain advantages over our butts, and especially so for the kind of doors and frames used with the thin, solid partitions, characteristic of these designs, and an important element in their economy. Hinges of this sort would not be so extensively used unless they had much to recommend them. They are, in fact, good-looking, serviceable, economical, convenient, and easily applied.

My attention was particularly called to them when acting some years ago as architect of an important building in Budapest, Hungary. Having become convinced of their great merit for certain purposes, I was anxious to use them here. I learned from a friend, a merchant, that very similar hinges were made here for export. He said he was buying them for 68 cents a dozen pairs. I called up the manufacturing concern, on the telephone, and requested a sample, stating the price, but was told they had never heard of hinges at 68 cents per dozen pairs and asked if I did not mean 68 cents per pair. Upon reporting this to my friend he said I had probably communicated with the wrong department, and advised me to try the export department, which I did with success. I bought a gross at the price named, but upon placing a second order was informed that the concern understood the hinges were being used in this country and the price would be 15 cents per pair. A jump of 165 per cent, apparently as penalty for being an American citizen. A more recent quotation is 50 cents a pair.

To one who has never seen these hinges applied, the operation appears formidable, but nothing could be more simple and easy. The two blades of the hinge are driven into the wood, but first slots are made for them by driving back the grain with a thin, blunt, chisel-like tool, the blade of which is slightly thinner than the leaf of the hinge, and the end pigeon-tailed (see Figure 2). The tool is driven

into the wood just as a nail would be driven, thus forming a slot slightly narrower than the leaf of the hinge. No screws are used. Before setting the hinge, the carpenter locates the holes and, when it is in place, drives pegs through them, thus securing the hinge firmly. It will be seen that one of the leaves is larger than the other, to allow for the rabbet on the door (see Figure 1). As the leaves are concealed in the wood there is nothing to rust but the knuckle, and this can be painted; so steel or iron may be used where, under other circumstances, bronze or brass might be considered necessary. These hinges are much more easily applied than butts, are mechanically more correct, require no screws, are less apt to get out of order, allow the door to be easily dismounted, and are better looking and more economical in many ways than butts. They are not generally made in this country because there is so little demand for them, but can be had from The Stanley Works. Their number is 5430 P. S.

A carpenter can, by grinding, easily convert any old chisel into a slot driver, and wire nails cut in half will serve for pegs which take the place of screws.

While it is perfectly possible to use mortice locks for rabbeted doors, the writer prefers rim locks.

For windows the same kind of hinges are used as for doors, and here they have another advantage over butts in that they permit the hinged edge of the sash to be received into a groove, thus affording an additional weather stop (see detail on Plate 12).

Since these hinges have become so expensive, the writer has evolved two other kinds which apparently leave little to be desired whether as to cost, efficiency, or appearance. One consists simply of a right-angle hook, and an eye with a small ornamental tip on the upturned end of the hook, and the other of two common screw-eyes and a pin. The whole cost of either hinge is not more than for the screws alone of the ordinary butt (see detail drawing and also Plate 21).

If properly applied these hinges are far from being unsightly. They should be screwed into both door and frame at a horizontal angle of 45 degrees from the plane of the partition, which may easily be done by means of a guide formed of a little block of wood having a hole through which the gimlet passes when the boring is done and which keeps it exactly in the desired direction.

Plate 36

This house is planned to stand at the side of a road near a rising slope of earth, onto which the rear part of the building extends. The verandah on the first floor projects over the road. The entrance at the side of the house is reached through the yard. The floor of the entry is about midway between the ground and first floors, and from it steps both ascend and descend. The dining-room and kitchen are on the ground floor. The living-room, three masters' bed-rooms, and two bath-rooms occupy the first floor, while on the second floor there are three more bed-rooms, one of them suitable for a nursery.

The plan although compact lends itself well to the methods of building which this work illustrates.

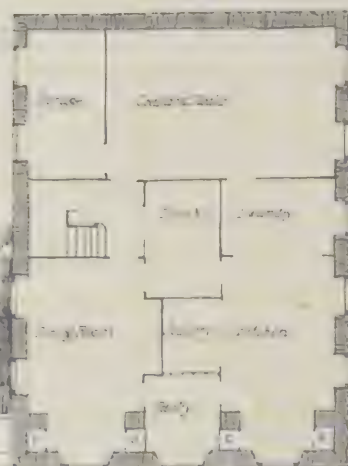
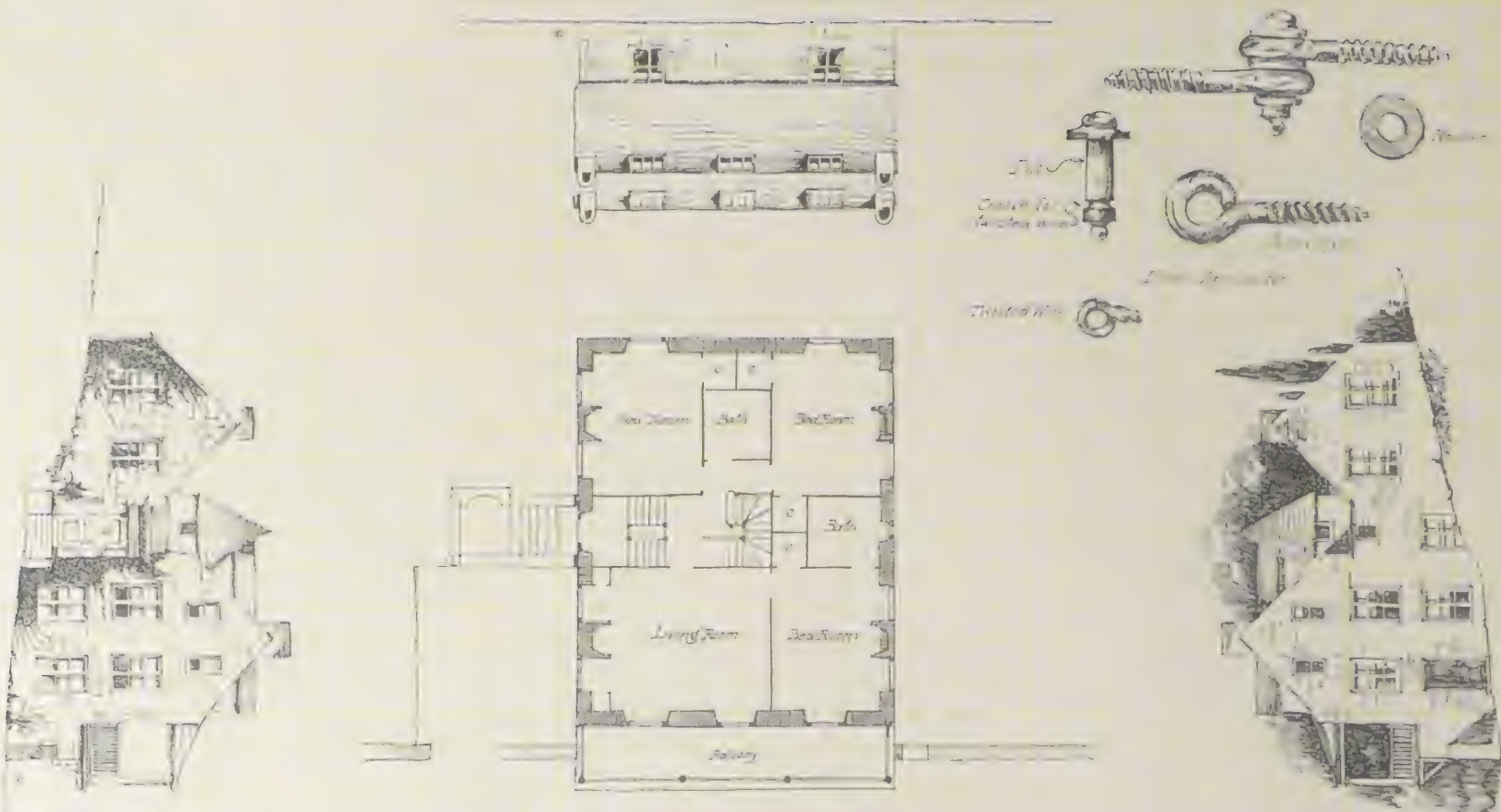
House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 36

Table of Modules

1 m	- 3'-9"
2 "	- 7'-6"
3 "	- 11'-3"
4 "	- 15'-0"
5 "	- 18'-9"
6 "	- 22'-6"
7 "	- 26'-3"
8 "	- 30'-0"
9 "	- 33'-9"
10 "	- 37'-6"
11 "	- 41'-3"
12 "	- 45'-0"
13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"

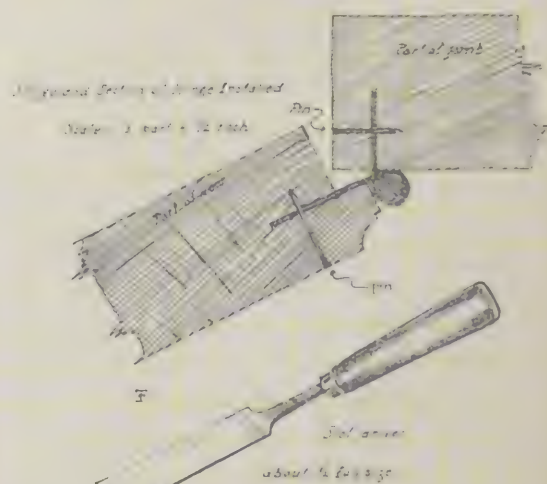
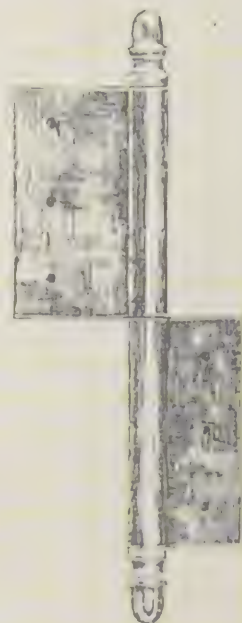
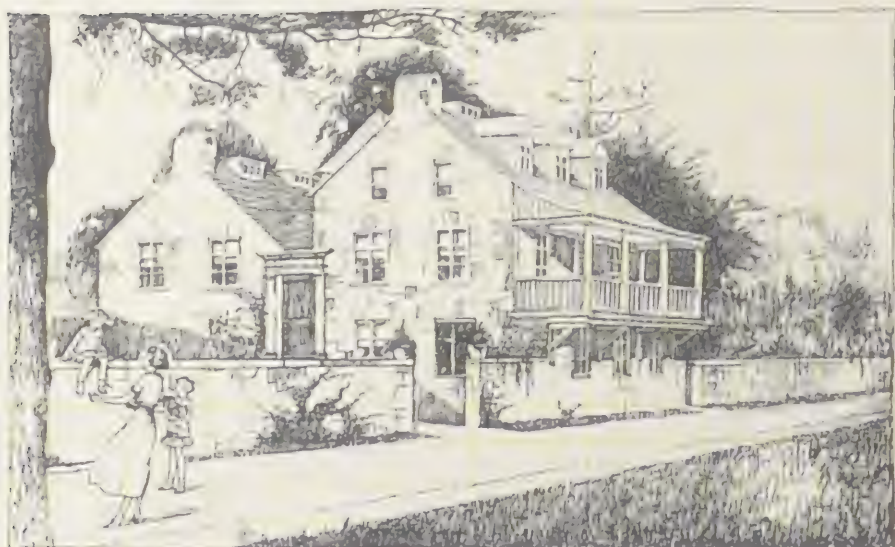
The Flegg Ridge Estate at Dongan Hills



Plan of Basement

Section of House

Road way



PRACTICABILITY

THE value of the doctrines contained in this work must, of course, depend on their practicability, and their practicability must in turn depend, in large measure, on the manner of their use.

The writer claims no new and sovereign road to economy; the way is old and humble. It consists in a multiplicity of savings, some of them very small, but which, when combined, swell to large proportions. Nor is it claimed that even the little savings may be had without trouble and care. Many of the processes recommended which are new, or at least unusual, depend for their success on the observance of precautions which it is an object of the writer to clearly explain. For instance, a chief item of economy lies in the ridge-dormers, but ridge-dormers can only be successfully employed where sufficient care has been taken to make them large enough, place them correctly, properly insulate the roof, and so construct them that they will not leak hot air in cold weather. If such precautions are not taken they will prove an expensive failure rather than a benefit. Another great item of economy is in the omission of all casing of woodwork, but if care is not taken to use suitable lumber, properly dried, there will be a great deal of warping and checking for which there is no necessity.* Much may be saved by substituting store-rooms above ground for cellars, but unless the concrete under the floors which are on the earth is thoroughly damp-proofed the result is not likely to be satisfactory.

If great economy is to be secured, no single item of saving should seem too small to be taken into account. All those here described should be employed, and as many more as the ingenuity of the builder can devise. The writer claims no monopoly in this matter. The ways of saving recommended are only those which he has been able to collect and apply. If others will follow the same plan the list can doubtless be greatly extended.

In the application of these and all other innovations in building one may safely count on the opposition of that unimaginative class which calls itself practical. The "practical" mechanic or builder is generally a man of limited education and outlook who hates innovation. He has learned how to do certain things in certain ways, any departure from which frightens him. His attitude is almost always one of instinctive opposition. Even when ready to admit that theoretically some new process or method ought to result in saving time or materials, he will think the risk and trouble involved in its trial not worth the prospective gain. Very often he is right, for as soon as the ordinary workman leaves the beaten track he is at sea; he hesitates, balks, loses time, and the saving which ought to result from the new method is often more than swallowed up in the loss of efficiency which novelty involves. The writer has found in actual practice, that many of these difficulties may be overcome by painstaking direction at the start, and that after the men have become used to the better methods they like them. To begin with, a certain amount of brain work must be supplied, and it is foolish to expect to find that commodity where it does not exist. The kind of brain power necessary in innovation is not the kind with which the average "practical man" is very fully supplied. He

has, as a rule, little imagination and no desire to involve himself in unaccustomed difficulties.

The experience of the writer is that if one shows the ordinary contractor how, by the adoption of a new process or method, he may reduce the cost of a piece of work, the chances are he will charge more for doing it that way. This habit of mind was well illustrated in the erection of an important building for which the writer was architect. Solid plaster partitions were specified. Instead of the usual framework of metal bars of the kind shown in Photograph 16, of Part IX, simple wires, as shown in Photograph 17, were called for. It was not unreasonable to expect that this would result in a large saving to the owner. The greater simplicity and economy of the new system were carefully explained to each bidder before he made his bid, so that he might figure accordingly; but the result was disappointing, as there was little apparent reduction in price. Upon one of my visits to the building when it was under construction, I found a whole floor equipped with framework, as shown in Photograph 16, above mentioned, which seemed surprising. I asked the contractor why he was throwing away his money by doing the work that way. He said it was the usual way and he did not care to experiment. "You know," said he, "I did not reduce my bid on account of the new method specified; in fact, I put on something extra for fear I might be required to use it." To this I replied I was sorry to see him wasting his money and suggested that he try the method specified on another floor, which he did. Some time after, he came to me and asked if I had a patent on that way of making partitions, "for if you have," said he, "I will go in with you and we will do all the partition work of the country."

The best way for the architect to try out these innovations is in the building of his own home. If he has in view the building of a house for himself, he will naturally be keenly desirous of reducing costs and perhaps willing to use methods which he might not feel justified in trying first on a client.

The methods and devices explained in this work affect practically everything in the building and its design. They constitute what may be called a new system of building. Great economies may be secured by its use, but in order to use it one must be equipped to do so. This does not mean that he must be supplied with special apparatus, for very little of that is needed; but he must understand the system and be able to direct those under him in its use. In other words, he must place his building operations squarely on this basis. Doubtless there will soon be those who will see the wisdom of so doing, but until then the layman is at a disadvantage. Certain features may be employed, but if great economy is desired the system should be used in its entirety. In the experimental buildings, already constructed under it, several things were tried which did not turn out as they promised; of them no mention is made. The processes described, unless otherwise stated, are those only which have been tried and not found wanting. They may be relied on, provided directions are carefully followed.

Plate 37

This general plan forms a hollow rectangle—almost a square, but the outline of the building is not so simple. A predominant mass with a high peaked roof occupies one corner of the figure and con-

* Some defects of this sort must, of course, occur in wood exposed to the dampness of a building under construction; but the labor and cost of correcting them after the work has taken its final bearings, is trivial when compared to the gain in economy and artistic appearance which the more honest methods provide.

Table of Modules

1 m -	3'-9"
2 "	7'-6"
3 "	11'-3"
4 "	15'
5 "	18'-9"
6 "	22'-6"
7 "	26'-3"
8 "	30'
9 "	33'-9"
10 "	37'-6"
11 "	41'-3"
12 "	45'
13 "	48'-9"
14 "	52'-6"
15 "	56'-3"

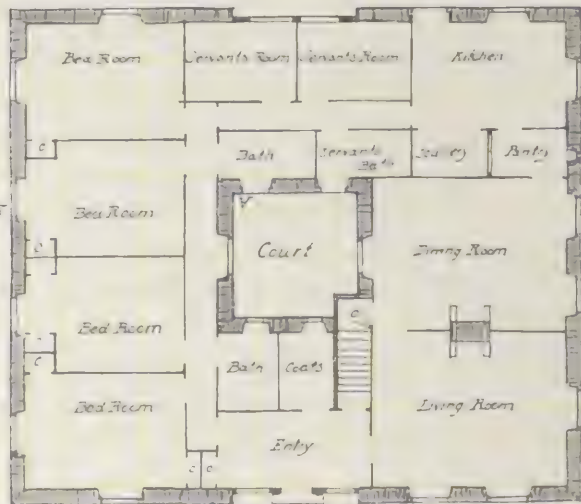
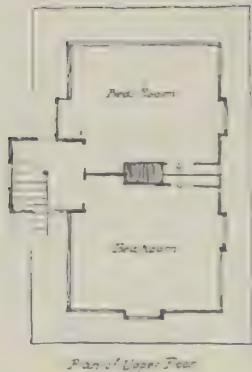
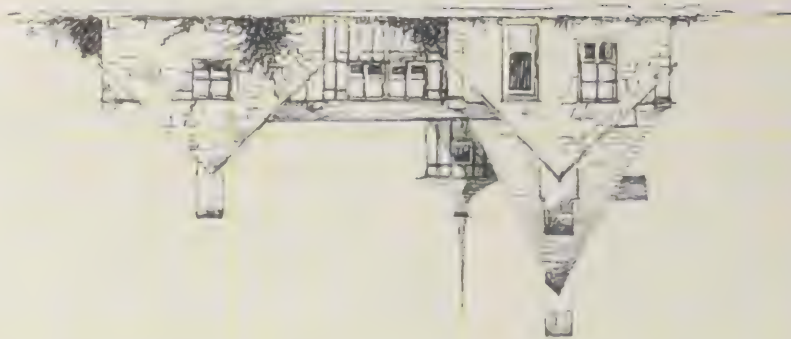


Fig 5

HALF-TIMBER CONSTRUCTION

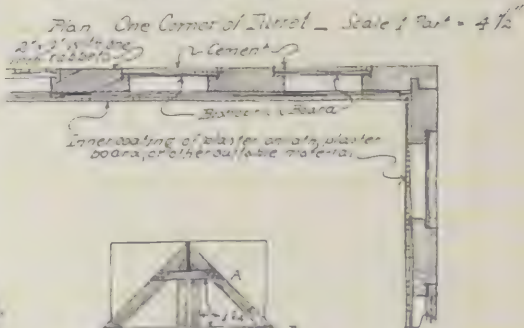


FIG 1

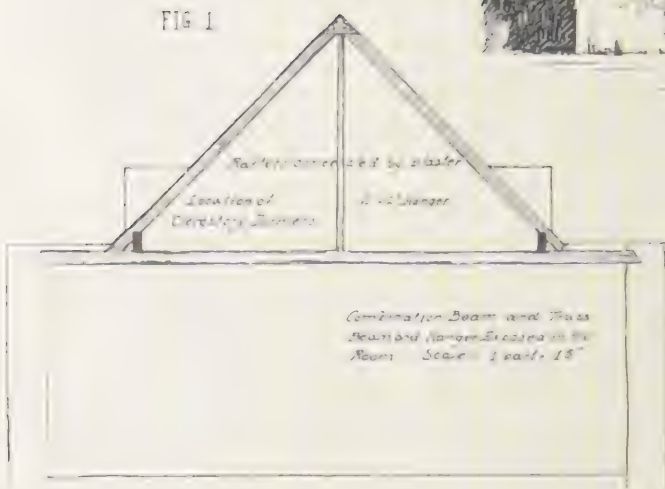


FIG 2

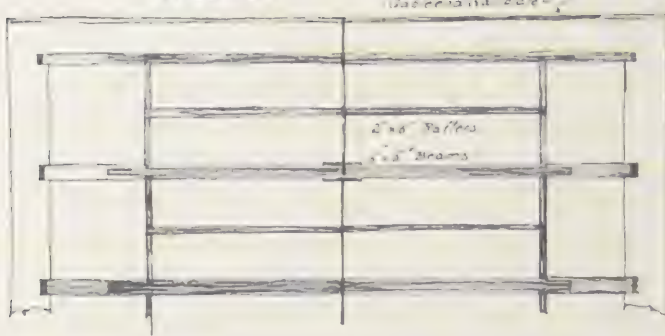


FIG 4

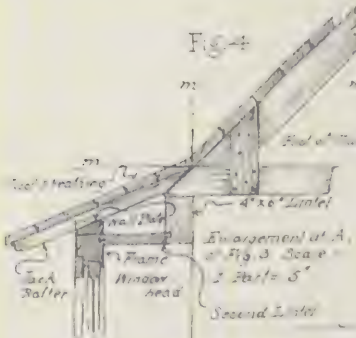
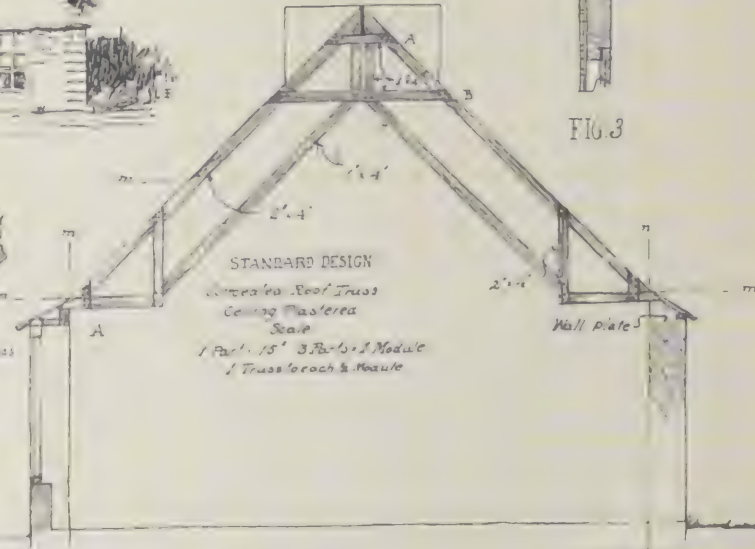


FIG 3



SMALL HOUSES

tains the living and dining rooms below, and two other rooms above. The opposite side of the rectangle is occupied by a one-story structure with a ridge roof and contains four masters' bed-rooms. The entry—more liberal than usual in these designs—is between the two principal parts of the plan. It connects with the living-room on one side and the bed-room corridor on the other. The service department occupies the corner of the plan back of the principal rooms. There are two servants' rooms, which are perhaps hardly

enough for the size of the house. The kind of roof truss used for the ridge roofs is peculiar, as are also the clearstory substitutes for ridge-dormers (see Part XXXIX). The outer walls of the turret and of the connecting link at each end of the building is of half timber construction, the filling between the uprights being of cement on "Bishoprick Board" according to the detail, Figure 5. Similar construction is used occasionally in some of the other designs. Its thickness is about $3\frac{1}{2}$ " including plaster (see Part XL).

PLUMBING AND DRAINAGE

PLUMBING is no longer a luxury, as it used to be, but a necessity. In houses of the best class every bed-room must have its bath-room. A dwelling having four masters' bed-rooms can hardly have less than three baths, one being for servants, while even in the working man's cottage a bath-room is expected. Plumbing has thus become a heavy item in the cost of building. It is a matter in which it is hard to economize and one that it is unwise to slight or neglect.

Plumbing is very dangerous to health when connections between the fixtures and the drain-pipe are made within the building, as it usually is, unless proper precautions are taken to prevent the entrance of sewer-gas. Apparently the only sure way to do so known to the Health Boards at present is to provide every fixture with a trap, and every trap with a vent pipe to the open air, to stop syphonage. Herein lies the chief cost of installing plumbing. According to the present New York regulations, which are properly very stringent, all back air pipes must be carried to the roof, which involves an immense amount of labor and materials, adding greatly to the cost of the piping and also to expense in other ways, for the pipes occupy space and often make necessary partitions thicker than would otherwise be required, in order to conceal them. It is safe to say that one-half of the cost of interior drainage is due to this method of ventilating traps; therefore, if some other sure means can be found to prevent the entrance of sewer-gas into the house the gain will be enormous.

It is not hard to demonstrate that this is possible. Water may be drawn from traps, and the seal against sewer-gas broken in two ways—(a) by direct siphonage, and (b) by indirect suction.

Every one knows that direct siphonage can only occur in a pipe which is full; therefore, if the discharge pipe from the trap be so arranged that it cannot be filled it cannot be siphoned. A trap is simply a bend in a pipe, having inlet and outlet. It is manifest that, if the outlet is made so large all the way from the trap to the main drain that it cannot be filled through the inlet, the trap cannot be siphoned.

When a large body of water rushes through a pipe which serves as a main drain to plumbing fixtures, it may suck air after it through the traps of fixtures attached to it, and with the air the water, which formed the seals of the traps. This is what is here meant by indirect suction. It is evident, however, that if the pipe through which the water rushes is open at the far end, no such suction through traps can occur because the air will enter by the easiest route—the open end of the pipe.

In view of these facts it will be seen that it is not necessary to ventilate every trap to guard against the danger of its being emptied by suction or siphonage, but simply to arrange the drainage in the manner above described, which would cost but a fraction of what the New York plumbing regulations now require to accomplish the same object.

In most places there are no restrictions to prevent the use of the methods here described. In New York and certain other large cities, however, present plumbing regulations must first be modified to permit of their introduction.

In this country, in making city ordinances in the interest of public safety, the mistake is made of specifying in the law itself the means

which shall be used to obtain that result rather than simply the result required. To legislate in that way is to assume that it is possible to say what is the best and most economical way of obtaining certain ends in building, which is a manifest absurdity. Therefore, when improvements of this sort are suggested which would, if used, save vast sums of money, almost insuperable obstacles are found standing in the way of their introduction.

In the installation of plumbing much economy lies in forethought in planning the house. By consolidating the fixtures about single lines and simplifying the piping so as to reduce its length and the number of bends and turns, a great deal may be saved. Where fixtures are placed in straight rows, as along one side of a bath-room, the cost of installation is less than where they are scattered about. And if they can be placed back to back, as along both sides of a partition separating two bath-rooms, the cost is still further reduced, because one line of piping will answer for both rows of fixtures. A similar arrangement may often be applied to the fixtures of a kitchen and pantry, or kitchen and laundry. If possible, the plumbing fixtures of an upper floor should be placed directly over those below so that one drain-pipe may do for both sets. Of course, it is not wise to spoil an otherwise good plan in order to save a little pipe, for in that case the cure would be worse than the disease; but it is always worth while to make the attempt to reduce the extent and intricacy of the lines, and one who plans with intelligence will frequently be able to make considerable savings in this way, without sacrifice in other directions.

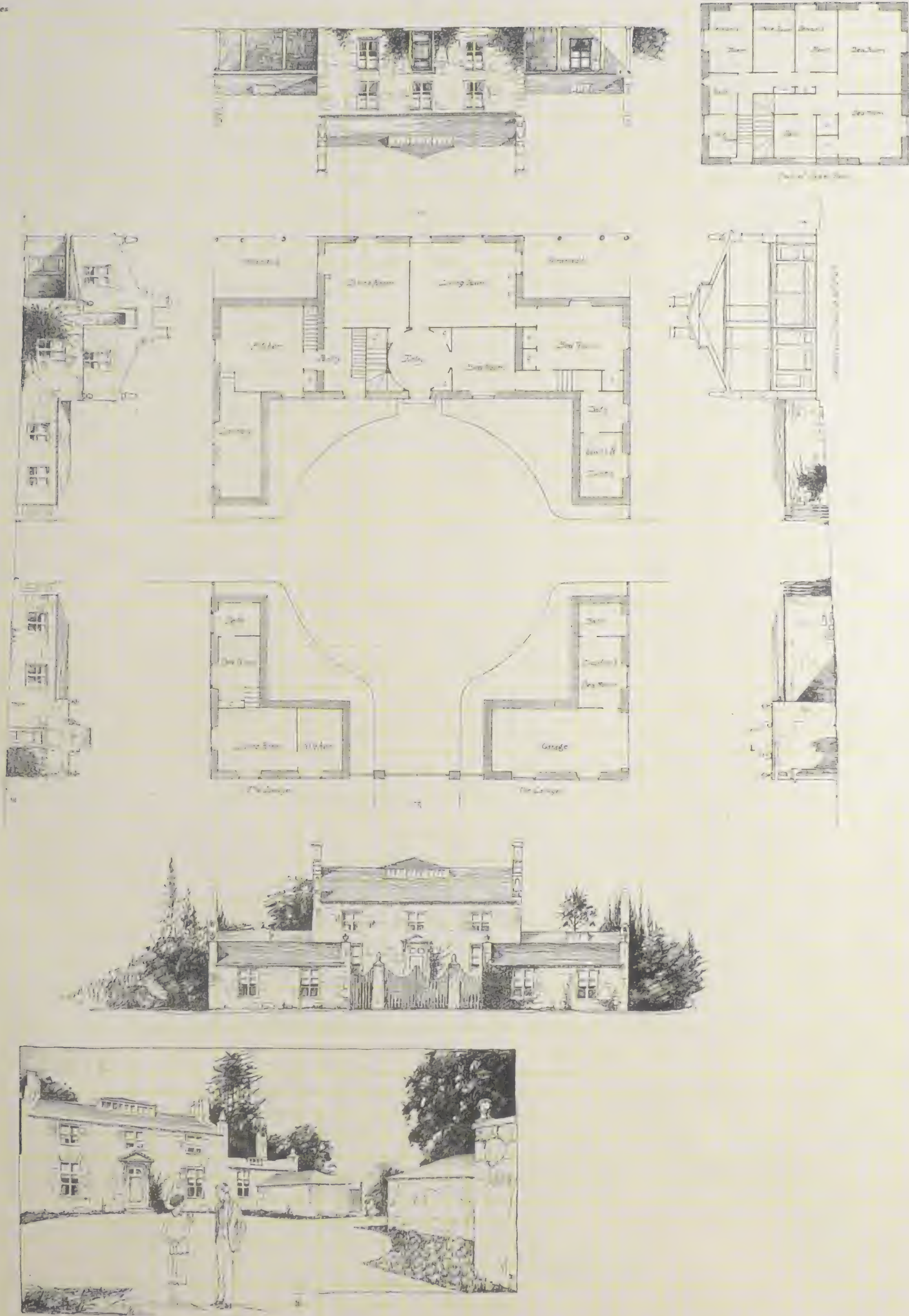
The time will doubtless come when people, generally, will prefer showers to tubs; because when properly installed, they are, in many ways better than tubs, as those accustomed to them well understand. Showers which deliver the water straight down are not suitable for use by women, because they wet the hair; but when the shower head is set at an angle, so that the water shoots out from the side, this inconvenience disappears. Baths of this sort are hygienically more perfect than tubs, for all impurities are immediately carried off, and in using them one may begin with a warm spray and finish cold. Showers use but a fraction of the water required for tubs, and are easier to clean and care for.

In the servants' quarters of the writer's city house there is a shower of the kind described, while in the country the servants have a tub. The maids of their own volition, asked to have this tub removed and shower substituted, as they liked the shower better; and they were right, for the shower does its work quicker and in a more scientific manner than the tub.

A good deal may be saved in the installation of plumbing by exposing the pipes in bath-rooms, pantries, kitchens, laundries, etc. A carefully laid out system of piping, enameled white and supported by neat brackets, with sufficient projection to permit of cleaning back of the pipes, is far from being unsightly, and it is more economical to arrange it this way than to conceal it in a partition, as is usually done. Plumbing pipes thus exposed are more sanitary than if buried, and the arrangement altogether more in harmony with common sense and sound methods of building. Of course it is not advised to expose pipes in this way in any living-room, but only in bath-rooms and other places where they legitimately belong. Nothing is more distressing to one who likes to see building done in

Table of Modules

1	m	-	3'-9"
2	"	-	7'-6"
3	"	-	11'-3"
4	"	-	15'
5	"	-	18'-9"
6	"	-	22'-6"
7	"	-	26'-3"
8	"	-	30'
9	"	-	33'-9"
10	"	-	37'-6"
11	"	-	41'-3"
12	"	-	45'
13	"	-	48'-9"
14	"	-	52'-6"
15	"	-	56'-3"



SMALL HOUSES

workmanlike manner than to find pipes of any kind exposed in the principal rooms of a house, as is frequently done nowadays.

All such blemishes may be avoided by a little forethought on the part of the designer, and not to do so is an admission of incompetence.

In places where there are no sewers, the disposal of sewage is always a problem of importance. The ordinary cesspool is not to be recommended where better may be had, and better may generally be had at no greater cost than the cesspool involves.

During the last twenty years the writer has had occasion to build a good many small sewage-disposal plants, and they have all worked successfully without repairs and without attention of any kind, except as mentioned below. When once installed they may be forgotten for many years at a time. They have been made in accordance with Figures 4 and 5, of Plate 27. It will be seen that an oblong tank of concrete or brick is made, divided, in the middle, by a cross wall in which there is set a U-shaped pipe, the two ends of which point down, with the turn astride the wall, so that one end is in the first of the two compartments of the tank and the other in the second. When sewage enters the first tank the heavy matter sinks to the bottom and the light matter forms a scum, which floats. The object of the U pipe is to allow the liquid, between the scum on the top and the sediment on the bottom, to flow into the second chamber of the tank, without inconvenience from either scum or sediment, when the first one is full. In the outer wall of the second tank is set a siphon, one end near the bottom of the tank and the other outside, below the bottom, and so placed as to discharge into the seepage pipe, of which there is about 80' for each house. A tank of the size indicated on the drawings should serve for two or three houses of the average size. The seepage pipe should have open joints and be covered with stones, to facilitate the seepage of the liquid into the ground. Two feet below the surface is a sufficient depth for the seepage pipe. It is best, therefore, if possible, to place the tank at a slightly higher elevation than the seepage line, so that the trench for the pipe need not be more than 2' deep. The seepage pipe should be almost level. The tank may be covered with flag-stones, or a cement slab, with a few inches of earth on top. It is usual to provide a manhole in the cover for each of the two compartments of the tank.

An interesting feature of this method of sewage disposal is that the solid matter is disposed of by the microbes, which are always present in sewage. When a particle of heavy matter enters the tank it sinks to the bottom, where the microbes attack it; small

bubbles of hydrogen gas form on it, which carry it up through the liquid, and when they break, it falls again to the bottom, and the process is repeated until the particle is consumed. There is always a thick layer of scum on the surface of the liquid in the first tank, from which there is no noticeable odor when the manhole cover is removed. The whole operation is, indeed, remarkably sanitary. About a year after installing the first of these systems, which I had built and which happened to be for my own house, I thought it might need looking after. In this case the siphon discharged into a little tank from which the seepage pipe led. This tank was opened. Instead of the foul liquid, which I had expected to find, what was my surprise to see water as clear as if from a spring. Very little sediment was found in the tanks. Five years later another examination revealed similar conditions. For the last fifteen years the system has had no attention and no examination has seemed necessary. Only once has there been any trouble. A stoppage occurred in the inlet pipe because it had been placed too high where it enters the first division of the tank. It was at the level of the scum bed instead of below it, as it should have been, and the scum clogged it. Since that defect was remedied there has been no trouble of any kind.

There is nothing novel about this method of sewage disposal, but what has been said may prove useful to some who might otherwise be put to unnecessary expense to obtain what may easily be had in this very simple and effective way.

Plate 38

In this design the dependencies play a great part. Two small outbuildings, one a garage, are so disposed as to form an entrance court of considerable importance, and thus add vastly to the fine appearance of the composition.

The house is entered from the courtyard. On the left of the circular vestibule is the staircase. Besides the opening to the staircase and entrance door, this vestibule has five other doors, one to the living-room, one to the dining-room, one to a bed-room, and two to closets. The building contains four masters' bed-rooms and two servants' rooms.

The small building called the lodge would doubtless be used by different families for different purposes—as a guest-house, an office, a studio or study; for servants, for a married couple, for the older boys of the family, or other uses according to the needs of the occupants of the house. Such a building would prove a useful and attractive addition to almost any house of this class.

ROOF FRAMING, GUTTERS, LEADERS, AND SKYLIGHTS

TWO types of ridge roof are generally used in these designs. In one the rafters simply rest on the wall, the plastered ceiling being attached to their under side, and in the other very light trusses are placed at half-module intervals.

The first of these two types, under certain conditions, is open to several objections, which may be avoided by using the second, *i. e.*, the truss. If, in single-story buildings or one-story wings, the ceiling is attached directly to the rafters and follows their slopes to the ridge, the room may become too high. If the walls at the sides are high enough for doors and windows, say 7', and the ceiling slopes up directly at 45 degrees, the height, of course, rapidly increases with the width. A room 15' wide would be 14' 6" high at its middle; and the average height 10' 9". Even this is often too much, and the difficulty increases with the width.

Although the room may be too high inside, the wall outside may be too low to receive a verandah roof, and in some of these designs it is hard to find a place for one on that account. Also:

When the ceiling slopes directly from the wall, a room must occupy the full space between walls if its ceiling is to be symmetrical; therefore, if any part of this space is partitioned off, on a line parallel with the walls, as, for instance, to form a corridor, the ceiling of the room becomes lopsided. Again:

An excessive height of ceiling makes a room hard to heat, and this difficulty is increased if there is no furred-off space under the roof. When a truss of the kind illustrated on Plate 37 is used, these difficulties either do not occur or are greatly mitigated.

The trusses, as has been said, are spaced at half-module intervals. They contain only about the same amount of stuff as would 2" x 8" rafters at the same spacing, and are stronger. They are easily made, the parts being simply nailed together, and as all corresponding members are of uniform length, there is perfect alignment between them. They are made at the shop in halves, which are fastened together when set up by nailing on the strips, *A* and *B*.

This roof provides a flat ceiling for 3' along the walls, reduces the average height between walls about 3', and provides a furred-off space above the roof, making the room easier to heat.

Figures 1 and 2, of Plate 37, illustrate another type of roof. This, too, provides for a flat ceiling along the walls, very convenient for corridors, and reduces the average height of ceiling. It also provides walls high enough to receive verandah roofs, together with a type of dormer which may be considered as a substitute for the ridge-dormer. This is called a clearstory dormer. It is not as effective as the ridge-dormer, but easier to reach.

In this roof a sort of combination beam and truss is used, the beam and hanger being exposed in the room. An arrangement which might be objected to by some, though the timbered ceiling offers new and interesting opportunities for decoration. The design for the house of Plate 23 shows how it may be applied.

Where simple rafters are used there is little about the framing which calls for explanation, except perhaps the relationship of rafters to windows and the method of anchoring them to the wall.

Here, as elsewhere, it is just as important to standardize methods as it is to standardize parts. Figure 1, of Plate 39, is a section through the top of a wall. The wall is first finished off, smooth and level, all the way around to the height *A*. The 2" x 4" plate is then

laid on it flush with the outer edge of the wall and without fastening of any kind. The rafters are notched to fit this plate, and held in place temporarily by tie strips. A little block of wood for anchoring purposes is nailed to the side of each rafter near its foot, and fascia boards applied between rafters, set flush with the outer face of the wall. The spaces between rafters are then filled, and the anchorage blocks, above mentioned, become embedded in the masonry and hold the rafters securely on the wall. The temporary tie strips may then be cleared away.

Rafters are centered at half-module intervals, that is to say, on the module and half-module lines, and as the placing of the windows is governed by these same lines, it is easy to establish a standard relationship between the two. There are, in fact, only three conditions to be met, as follows:

First. Where the window head comes below the eaves. This is illustrated in Figure 2, of Plate 39. The wall plate crosses the head of the window, resting on the frame. The splayed jambs are carried up until they meet the ceiling, which follows the slopes of the roof, as shown in Figure 3. The triangle *a, b, c* (Figure 2), above the window, is not filled with masonry unless the piers between windows are small. When it is filled the masonry rests on a lintel, alongside the wall plate.

Second. Where part of the window comes above the eaves. This condition is illustrated in Figures 4, 5, and 6. The centers of the rafters *R* fall on the same lines as do the sides of the window-frames, and the rafters are notched to receive the frames. This leaves the triangle *m, n, o* (Figure 5) on each side to be filled, which is done with $\frac{7}{8}$ " sheathing resting on the rafter from *m* to *o*, set flush with the outer edge of the window-frame and covered on the outside with building paper and the roof-covering. The inside is finished by nailing strips on the sheathing and rafter, to hold wire lath or plaster board. The whole thickness, including air space, is less than 2".

Third. Where the entire window is above the eaves. This condition is sufficiently explained in Part XXXIII on Dormers.

Gutters and Leaders.—In these houses gutters are used only where necessary. In general, little harm comes of letting the eaves shed water onto the ground, especially where there is no cellar, as is usually the case here. It is only where the roof area is large or where the drip from the eaves would incommode people, as at entrances or walks close to the house, that gutters are necessary. The kind generally used are simply hanging gutters (see Figure 1). The best are of copper, but wooden ones are very good, and much better than any made of metal that rusts. Copper has the great advantage of not requiring paint. For the same reason, copper leaders are to be preferred to any other kind, but fibrous leaders are excellent, if protected against injury near the ground. This is done by extending the iron drain-pipe up, from one foot to two feet above grade, to receive the fibrous leader. Sometimes the gutters are made as indicated in Figures 2 and 3, but they are more expensive than hanging gutters and little better. Where the eaves are broken up by dormers and tops of windows, as they are in many of these designs, there is great advantage in dispensing altogether with the gutters, for otherwise a leader must be provided at each break, which is both expensive and unsightly.

Skylights of the kind used in these houses are very economical

Table of Modules

1 m	- 3'-9"
2 "	- 7'-6"
3 "	- 11'-4"
4 "	- 15'-0"
5 "	- 18'-9"
6 "	- 22'-6"
7 "	- 26'-3"
8 "	- 30'-0"
9 "	- 33'-9"
10 "	- 37'-6"
11 "	- 41'-3"
12 "	- 45'-0"
13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"

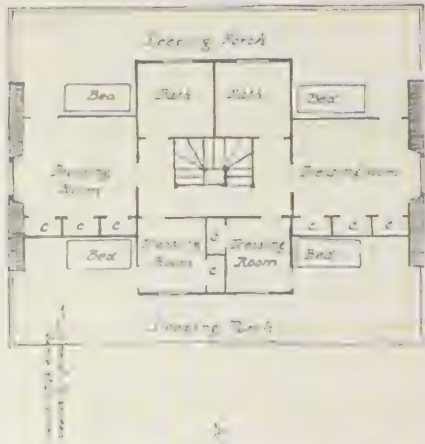
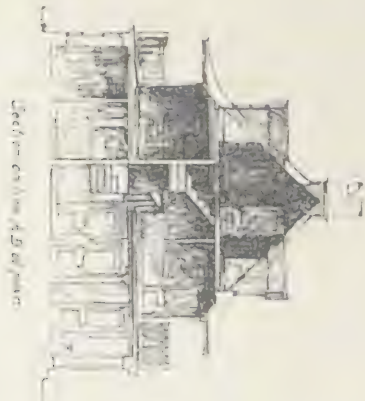
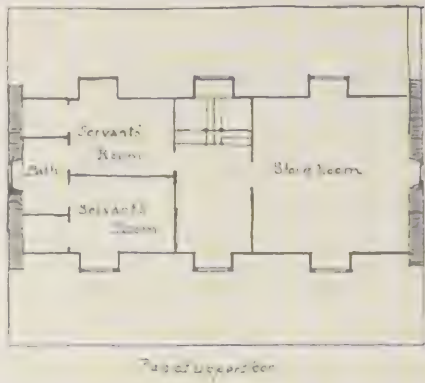
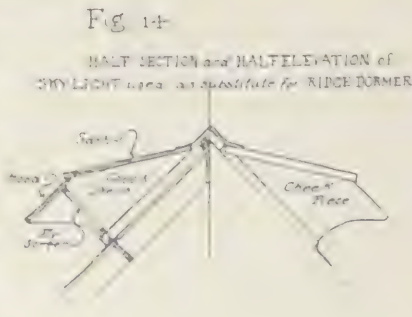


FIG. 1
SECTION through TOP of WALL
Scale 1 part = 9'

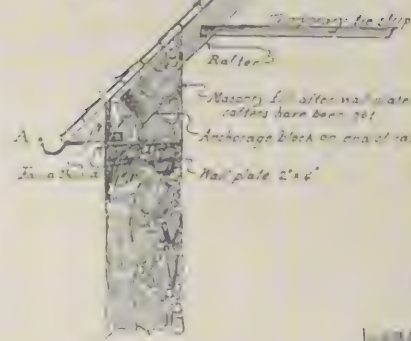


FIG. 2
SECTION through WINDOW HEAD and GUTTER
Scale 1 part = 9'

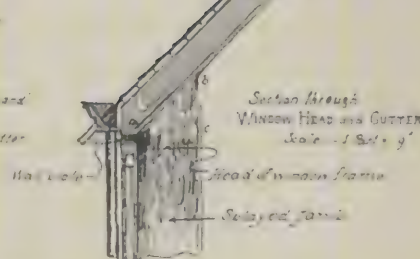


FIG. 7
SECTION through GUTTER
Scale 1 part = 3'

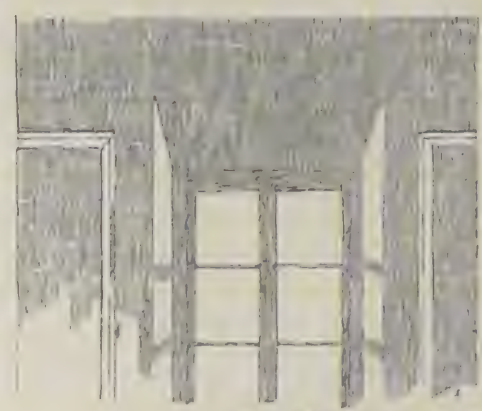
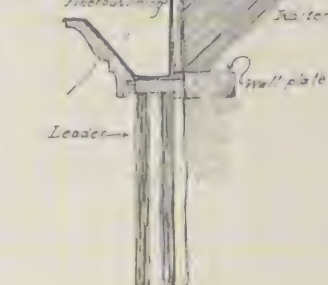


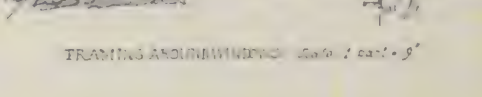
FIG. 5
Plan Scale 1 part = 9'



FIG. 4
SECTION through WALL
Scale 1 part = 9'



FIG. 6
FRAMING AND WINDOW HEAD
Scale 1 part = 9'



SKYLIGHT used as substitute for RIDGE DORMER
Scale 1 part = 9' - 1 part = 9'

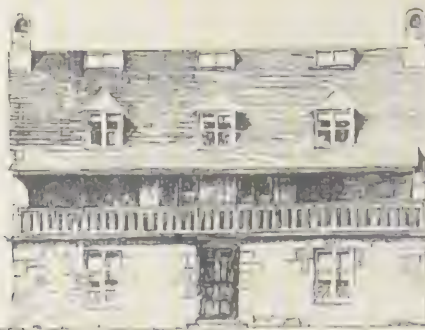
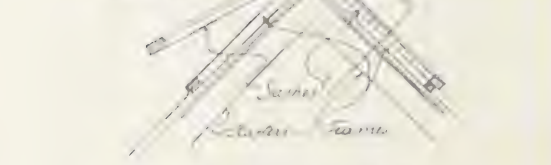


FIG. 8
ELEVATION of SKYLIGHT
Scale 1 part = 9'



FIG. 9
SECTION through SKYLIGHT
Scale 1 part = 3'



FIG. 12
SECTION through Beam
Scale 1 part = 3'

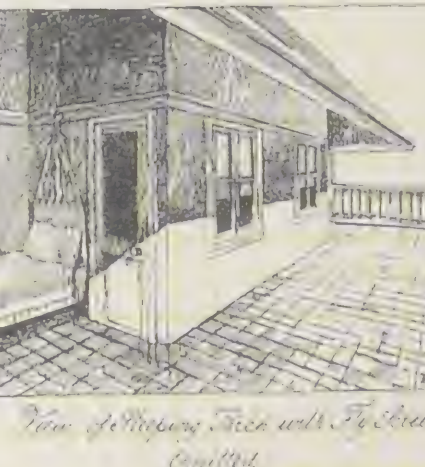
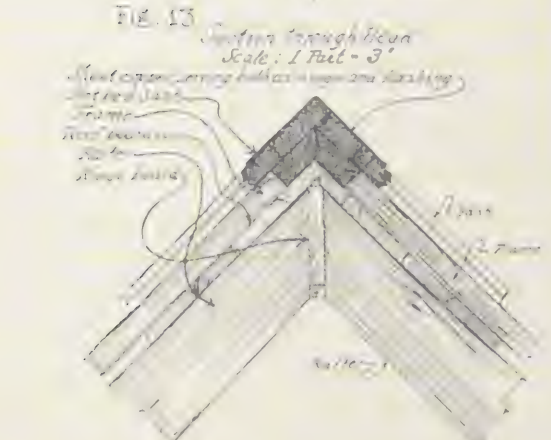
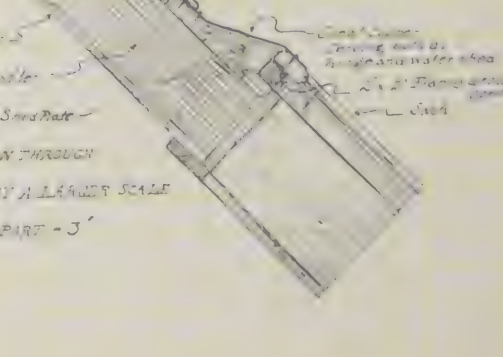


FIG. 10
SECTION through WALL
Scale 1 part = 3'



SMALL HOUSES

and simple both in construction and operation. They are indeed too simple to please any but the intelligent, being nothing more nor less than hot-bed frames of the sort gardeners use, and operated very much in the same way. Figures 8, 9, and 10 explain their construction and manner of setting when placed below the ridge of the roof.

The skylight is, as has been said, simply a hot-bed sash. The curb upon which it lies is made of 2" x 2" dressed stuff which lies on the roof boarding, frames the opening, and receives the turned-up edges of the roof covering. At the head of this frame is a piece of wood, triangular in section, called a "shed plate" (see Figures 8, 9, and 10). The sash is held in place on its curb by a piece of sheet copper, which covers the shed-plate, extends up under the roof covering, and is fastened to the head of the sash. This piece of metal acts both as flashing and hinge. No other hinge is used. Water running down the roof flows over the copper and over the skylight. These skylights, if properly made, are perfectly weather-tight; but they should be provided with condensation gutters, drained to the outside. A skylight of this kind in use may be seen in Photograph 35 near the center of the picture.

When placed in pairs at the ridge these skylights may be used as substitutes for ridge-dormers. Thus employed they are provided with cheek-pieces and fly screens (see Figure 14). The skylights are less expensive than the dormers, quite as effective, easier to operate, and less conspicuous when closed. They would have been more generally used in these designs if their advantages for the purpose

had been sooner thought of. Figures 11, 12, and 13 show how they are installed at the ridge. Here the sheet of copper, which serves as watershed and hinge, goes over the ridge.

Plate 39

This is a new type of house in which ordinary bed-rooms are for the most part missing, sleeping-porches being substituted for them. On the ground floor there is a bed-room and a bath of the ordinary kind, but the first floor is entirely given up to the sleeping-porches and their accessories. The dressing-rooms, bath-rooms, etc., occupy the center of the floor, while the porches extend the full length of the house on each side. The beds are placed in the angles of recesses, the better to protect them from drafts, and the overhang of the roof is sufficient to insure them against wet even in driving storms. This arrangement is the result of considerable experience, the writer having slept out of doors from May to December continuously during the last ten years. The object here is to obtain the full benefit of the open air without annoyance from the elements. The floors of the porches, though not entirely covered by eaves, have an outward pitch to shed water.

The story height of the porches is as low as practicable, both because height is not needed for air—all being open—and because the lower the eaves the greater the protection against wet. Two servants' rooms, a bath, and a store-room occupy the roof story which is reached by a continuation of the main staircase.



No. 35

"Bowcot" from the west. Ridge-dormers open. Skylight near center of picture.

HALF-TIMBER AND PLASTER WORK

IN certain places in these designs there are indications of what might be taken for half-timber work, but, strictly speaking, it is not that, neither is it the usual counterfeit, but represents a new method presently to be described.

Half-timber work is an old form of construction much in vogue in Europe during the fifteenth and sixteenth centuries. It was made by setting up posts and braces and filling in between with brick, plaster, or other suitable material. Work of this sort is always interesting and often most picturesque.

In America we have numerous imitations of its appearance but not of its substance. What pretend to be beams are simply boards nailed to the sheathing. The country is full of what purport to be half-timbered houses but which are, like so much else in modern building, clumsy attempts to deceive, constructed design, scenic architecture more suited to the stage of a theater than for outdoors. They belong to that great class of structures which may well serve as object-lessons to show how little common sense has to do with present-day building design.

When stone is generally used for walls, occasions often arise where thinner closures are convenient. A case of that sort occurs in the design of Plate 40. For such places the modified half-timber work as illustrated by the detail figures may be used.

The chief disadvantage of the old half-timber work was that the beams had a habit of shrinking away from the fill, making cracks between the two which it was hard to keep closed. For this reason many old half-timbered houses, especially in England, have been covered with slate or stucco.

By the use of modern appliances the cost of this kind of work may be reduced and its quality improved.

The half-timber work of these designs is made by using much thinner uprights than formerly and filling in between with lath and stucco. The uprights, crosspieces, and braces are notched at their outer edges to receive "Bishopric Board," or similar material, which is plastered almost flush with the outer face of the timbers. Where the enclosure is small, as in turrets, the timbers may be very thin. Two inches is sufficient. To the inside face of the uprights furring strips are nailed which support the lath and plaster. The whole thickness of the wall, therefore, including the air-space, is not more than $3\frac{1}{2}$ ". The horizontal members and braces, where they are used, are notched to the uprights as shown on the isometric projection, Figure 1. They are fastened to the uprights, preferably by pegs, as indicated on the drawing. Figure 2 is an elevation of a part of the turret at a larger scale. Figure 3 is a detail of the plan, and a section through the wall is given in Figure 4.

Walls of this sort are peculiarly well suited for stair-turrets, both because of the little space occupied and the ease with which the stair-strings may be attached. The stairs also serve to brace the walls, and the construction, though thin and light, is very strong.

If cypress is used for the timbers, it need not be painted. The soft gray tone which that wood assumes when exposed to the weather blends well with the stonework, producing a most attractive color effect.

Walls of this sort need not necessarily be confined to small enclosures. Whole houses may be built with them. In that case, however, the timbers should be somewhat heavier, but if the story heights are low, they need seldom exceed 3" in thickness.

In making walls of this sort, great care must be taken to prevent

the entrance of moisture at the joints between the woodwork and stucco. The rabbets should be thoroughly damp-proofed before the "Bishopric Board" is applied, and the wood thoroughly seasoned before using. Even when all such precautions are taken, there is likely to be some pointing-up necessary before the work takes its final bearings. Moisture is indeed the chief danger in this kind of work, and unless that is sufficiently guarded against, it is not to be recommended.

Thin closure walls may be had by another process which is convenient and free from the difficulties inherent in half-timber work; but the result is not so attractive in appearance—that is, by making a light framework of wood for the support of metal lath, and plastering with Portland cement mortar to any desired thickness or strength. If the several coats are applied promptly, before the cement has time to oxidize, the adhesion between them will be perfect and result in a sort of modified reinforced concrete. Under this process no wood appears on the outer surface of the work.

Much less interior plaster is used in these houses than usual. As explained in Part XXX, all horizontal plastered ceilings are dispensed with. The usual interior brown coats on exterior walls are also omitted; but the success of this procedure is chiefly due to local conditions, the masonry being of soapstone, which is impervious to moisture and an excellent non-conductor of heat. Under other circumstances it is likely that equally good results might be obtained by coating the inside of walls with an efficient damp-resisting compound, of which there are several on the market, or lining it with plaster board as explained in Part VI, or both.

In Part VI it is also explained how the inside of exterior walls is made of concrete. Owing to the excellence of the forms,* the interior face of the wall is so smooth and in such good alignment that no truing up, such as is usually done in the brown mortar, is needed, and the white plaster or hard finish may be applied directly to the concrete.

Before doing so, however, the surbase is run in Portland cement mortar. In Part XXI it is told how bases for partitions are made by simply laying a strip of dressed lumber, of the proper thickness on the line of the partition and plastering down to it. These bases are painted black or a dark color. As the Portland cement base is of corresponding height and projection and painted the same color, there is no apparent difference between them. The cement base is easily run by fastening a thin strip of wood at the proper height above the floor, as a screed, and plastering with cement below it.

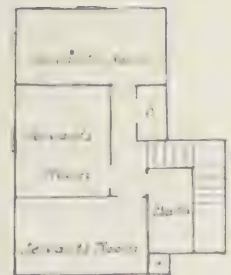
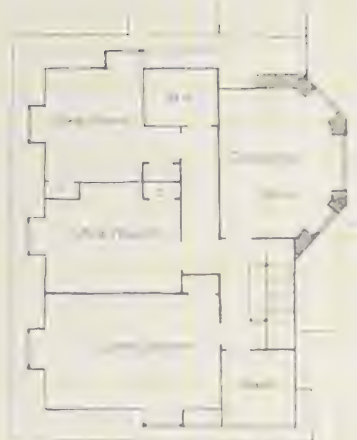
Plate 40

The plan of this house, though rather formal in its arrangement, leads naturally to a picturesque exterior. The octagonal entry, 15' in diameter, may be considered as an additional living-room, and in this respect the house is larger than most of the others. The extra room downstairs is repeated in the sleeping-porch above, a feature which in the future is doubtless destined to become a necessary part of every properly appointed country house. An unusual arrangement in this house, as compared to the others, is the roof story containing the servants' quarters. If the house had a cellar, these servants' quarters might change places with the storeroom in the wing.

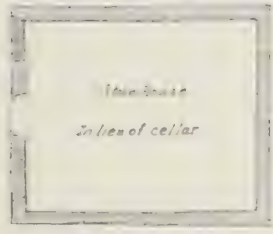
* Described in that same part.

Table of Modules

1 m	- 3'-9"
2 "	- 7'-6"
3 "	- 11'-3"
4 "	- 15'-0"
5 "	- 18'-9"
6 "	- 22'-6"
7 "	- 26'-3"
8 "	- 30'-0"
9 "	- 33'-9"
10 "	- 37'-6"
11 "	- 41'-3"
12 "	- 45'-0"
13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"



Plan of First Story



Plan of Second Story

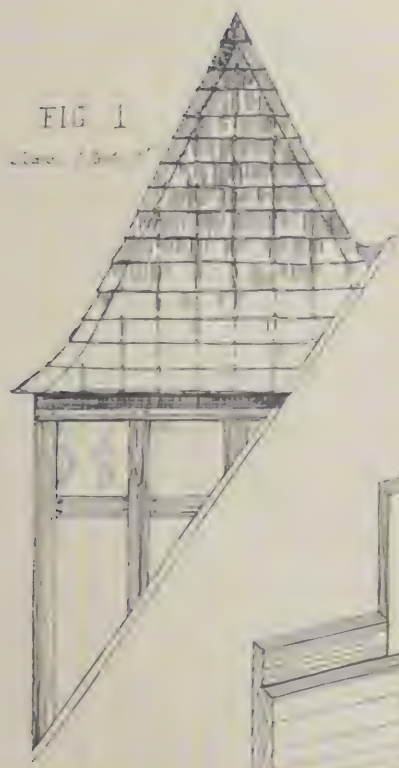


FIG 1



FIG 2

Isometric Projection

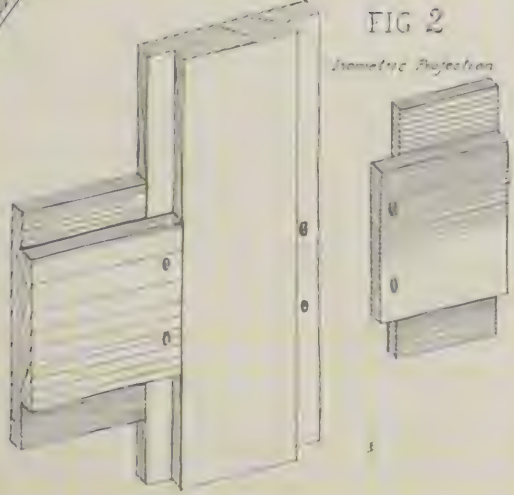


FIG 3 Plan Scale 7/8" = 1'-0"

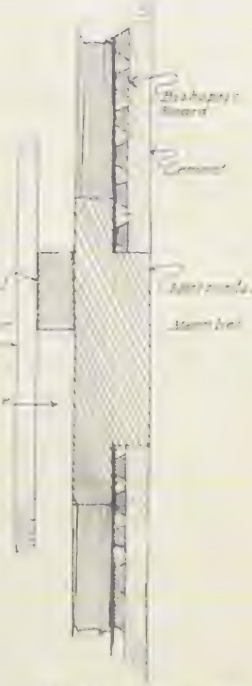
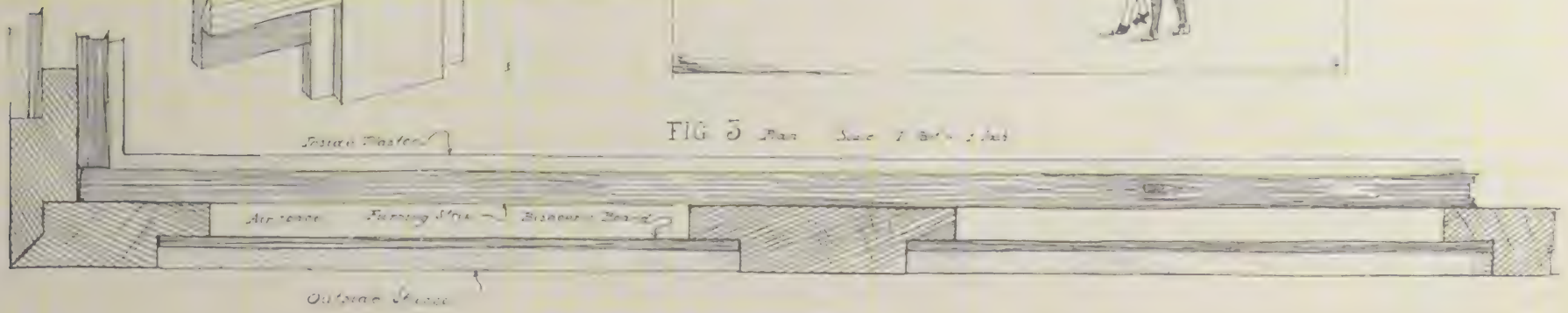


FIG 4 Section Scale 1/4" = 1'-0"



Outdoor Section

SIMPLICITY

THE older one grows, and the more he learns, the greater the value he places on simplicity in all things; that, at least, has been the writer's experience, and in nothing is simplicity more to be desired than in architectural design.

Is it not true, that the greatest works of art are those which seem to have been produced with the least effort? They appear in each case to be the simplest and most natural thing to do, and, indeed, they could hardly be great works of art if this were not so; for how can a thing which appears labored and strained be a masterpiece?

It is reported that Michael Angelo said it was not hard to make a statue; one had simply to uncover the figure as he saw it in the block of marble.

It seems to the writer that a great fault in much of our architecture comes from trying to do too much. There is a straining after effect, a superabundance of motive with a consequent lack of restraint, dignity, and repose. Over-elaboration is the resort of the under-trained man. One lacking in taste and refinement, and unacquainted with the principles of design, feels he must always be doing something. He does not know how to obtain his end by simple means, so proceeds to wallow in the slough of complication. He does not understand that it is harmony and fitness which count in architectural design, that if these are lacking, no amount of elaboration will help matters, but if present little else is needed.

Simplicity in design leads to simplicity in construction; the two must go hand in hand, and both are conducive to economy. No argument is needed to prove that the simple method is the most economical, every one will admit it; but it is not so well understood that the best, the most satisfying and lasting results, are those obtained by simple means. To depend successfully, however, on simple means calls for skill and refinement of taste on the part of the designer. When the means are simple, there is less chance for concealment, one stands in the open, so to speak. Where nothing is covered or disguised, a thing to appear right must be right, and the one who makes it must know what is right, and how to produce it.

As an illustration, suppose one has to design a wrought-iron grille. The simple way is to depend for beauty on the shape and arrangement given to the bars alone, that is to say, upon the ornamental pattern formed by them. A more complex way is to introduce foliage or leaf ornament in combination with the ornamental arrangement of the bars. One who adopts the latter plan will find his task much easier. The ornament will help him to slur over difficulties, cover defects, or perhaps to avoid them altogether, and his product may be very beautiful. On the other hand, one who rejects all help from applied ornament and relies solely on the pure beauty of his lines and their agreeable combination to obtain an artistic result has much the more difficult task, but if he succeeds his production will be of a higher, more lasting and satisfying type than the other. The design will be more easily understood and its beauty more apparent to those of refined taste and discriminating judgment.

A great aid to good design is to think straight—to fix one's attention steadfastly on the object in view which, in architectural design, is to combine and use the structural forms in ways which will produce a work of art. The truer the aim, the surer the result. Now the way to aim true is not to cover up and disguise the constructive features but to give them agreeable and reasonable forms.

Reason is the highest gift of man, and if he uses forms and methods which cannot be justified on reasonable grounds, how can his production be a work of art? Here it is that simplicity is the greatest possible aid to a fine result. If the means are simple, the aim will be apparent and the purpose clear.

What is it that makes some, even among the very humble architectural productions of Colonial days, so attractive? Is it not the simple and straightforward methods used; the absence of all pretense and affectation combined with an instinctive sense of good proportion? Who has not been charmed by the fine appearance of the gable end of some old house, where the whole design consists of only about half a dozen lines. The builders knew what they wanted, and aimed true to the mark. In a very humble way and quite unconsciously they applied to their work precisely the same principles which guided the great builders of the twelfth century in the production of masterpieces of design: the principle that construction is not a thing to be covered up, or distorted out of semblance to itself, but shown and made beautiful by the refining influence of good taste, and good taste always has truth for its basis.

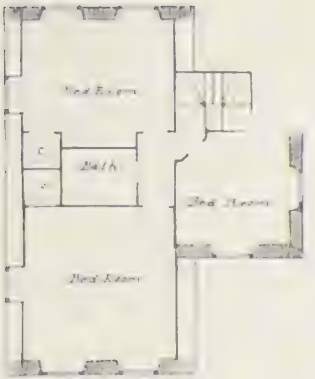
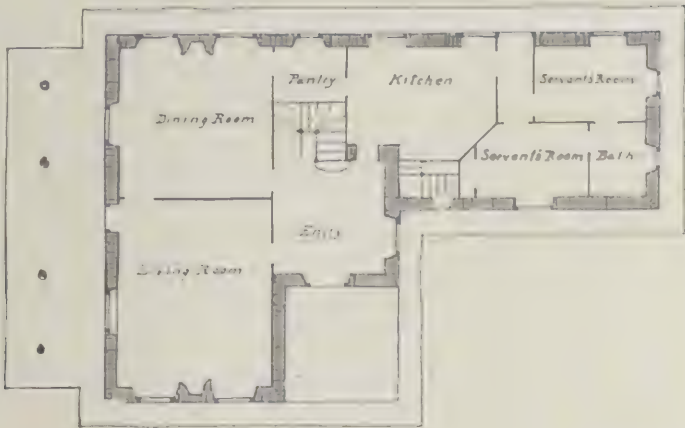
It is doubtful whether many of the most charming of the early architectural productions of this country were designed by people who called themselves architects; they were housewrights and carpenters. They had great ambition to reproduce, as far as the humble means at their disposal would permit, the refinements of European architecture. For the main characteristics of the classic orders they probably depended in the first instance on information contained in builders' guides and other handbooks brought from England. From these sources they might have obtained the exact proportions and details of those orders had they been so minded, but because they were unconsciously using in their work the same principles which had guided the Greeks in theirs, they did not do so. The Greeks worked in stone and gave to the orders proportions and profiles suited to stone; these men worked in wood and instinctively modified the details accordingly. It made no difference what they called themselves, whether housewrights, carpenters, or architects, they were practising architecture in the best sense of the word, and, in so doing, obtained results which could hardly be more satisfactory to the most exquisite taste. This fortunate result seems to have come about through the necessity, forced on them, to think for themselves. Where more exact archæological information was available, and the opportunity to copy easier, the results were different and that freshness, vigor, refinement, and originality which are the characteristics of the best Colonial architecture were missing. This one sees in the work of the much overestimated Bullfinch, also in that of Thomas Jefferson and others who gave to their wooden architectural forms the heavy profiles and proportions proper for stone, and who were thus the forerunners of the Greek absurdities which followed.

Ornamental details were difficult to make in Colonial times, and were, therefore, used sparingly, and this restraint too, doubtless, aided immensely in obtaining fine results.

Some time ago I had an experience which seemed to show the process by which much of the interesting and charming detail so often found in Colonial work came into being. I made a sketch of a fireplace mantel and gave it to a man, who had long worked for

Table of Modules

1 m	-	31'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'-
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'-
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'-
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"

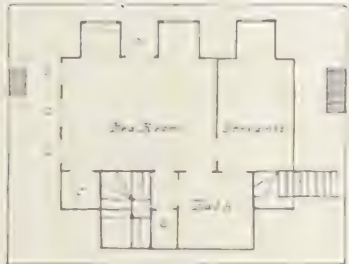
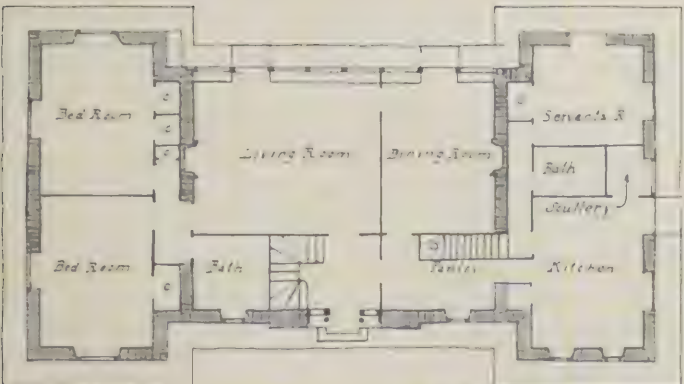


Plan of Upper Floor

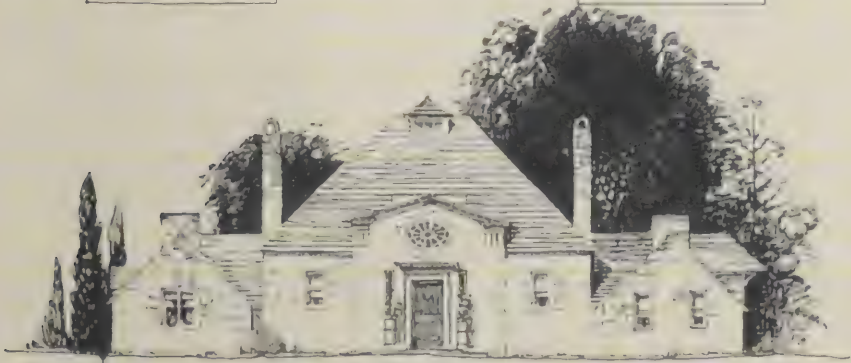
HOUSE A.



HOUSE B.



Plan of upper floor



SMALL HOUSES

me, to carry out. He was a village carpenter of more than average intelligence. In giving him the drawing, I explained it to the best of my ability, and had no doubt he could follow the directions. Some days later he showed me what he had made and asked if it was not what I wanted. It was not at all what I had expected; but it was what I wanted, for, while holding to the main proportions and general appearance of the design, he had used details of a kind I should never have thought of making but which were entirely suitable to the wooden construction. Altogether it was so like what one sees in Colonial work as to leave no doubt that its origin was similar.

Plate 41

The two designs of this plate represent two very dissimilar plan types. House *A* is L-shaped, having an entrance turret in the re-entrant angle. This arrangement renders necessary a somewhat larger entry than usual, but if this is a fault it is not without some

compensation, for a liberal entry does much for a house. The service department is entirely disposed in the long arm of the L, which part of the building is only one story high. The three masters' bed-rooms which the house contains are all on the upper floor in the main part of the building. The living-room and dining-room are *en suite*, and have a verandah on one side of them.

House *B* has practically the same accommodations as House *A*, but two of the masters' bed-rooms are on the ground floor. Unlike the other plan, the living-room and dining-room are not at the corners of the building, but they would be none the less cheerful on account of their large window area, practically one entire side of each of these rooms being of glass. The service department of this house is not so completely cut off from the rest as in the other plan, for one of the maids' rooms is on the upper floor; but this is an arrangement which is preferred in some cases, especially where there are young children in the family.

FIREPLACES

IS anything more suggestive of home life and comfort than the open fireplace? To one accustomed to the joy of an open fire the passing of this feature, in large measure, from modern life must seem a great misfortune. Home without a fire on the hearth is hardly home, and certainly not home in the full sense of the term. Although the open fire is not so much used as formerly, it still retains its hold on the imagination to such an extent that the place for it is still regarded almost as being essential for the more important rooms in every house. Without it the room has a dreary look, which is not relieved by the presence of a steam radiator. Even though the fireplace may be seldom used, it is a most desirable thing to have; for occasions arise when it is almost a necessity, and no

from an open fire is entirely radiant, and in the ordinary fireplace at least five-sixths of the rays are cut off by the construction itself and do not reach the room. Those which escape do not heat the air directly, but only the walls and other objects against which they strike. These, in turn, heat the air by contact; the air of the room is therefore generally cooler than the walls. The Franklin stove heats both by radiation and contact of the air with the stove and its pipe, and is, therefore, much more economical; but a stove is seldom a beautiful object, especially when there is no fire in it.

Many attempts have been made to increase the efficiency of the open fireplace by conducting air around the fire-box, which in that case is made of iron; but such fireplaces are seldom very efficient, as



No. 36

Tile fireplace and border of tile around room.



N 37

Room at "Stone Court," residence of the author. Fireplaces with economizers.

feature can be of more decorative value than the well-designed fireplace. Its mere presence is suggestive of comfort and it is, therefore, well worth retaining, even at considerable cost, but as used in these houses the cost is little. Here the object is economy, so, like most other parts which go to make up the house, this one is standardized.

On Plate 42 is a drawing of the ordinary fireplace. It consists merely of a border of tiles around the opening and a wooden shelf. The tiles are 6" x 6" x 1" common, red, Ohio floor-tiles, laid with a half-inch joint. As the wall of the house is not thick enough to receive the whole fireplace, it projects somewhat into the room, forming a breast to the height of the shelf, the sides of which are plastered. The front hearth is made of the same kind of tiles, and they may also be used for the lining if there is an iron fireback, although in the sketch fire-brick is indicated.

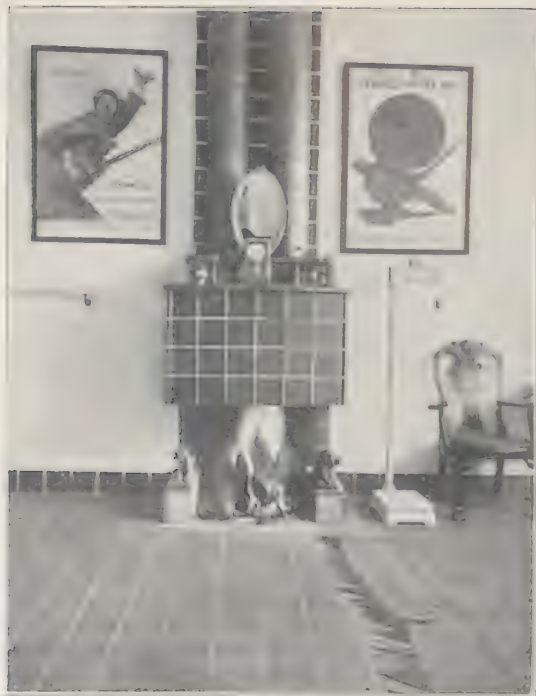
Simple and inexpensive as these fireplaces are, there is nothing common or cheap in their appearance, as may be seen from Photograph 36. Though costing little more than common brick, the tiles have not the crude roughness of that material and do not appear so unsuitable for an interior.

The chief objection to the fireplace of this sort is its inefficiency. Only a small fraction of the heat of the fuel is utilized. The heat

the heating surface thus obtained is not sufficiently great, and they are expensive both to construct and on account of the larger space they occupy.

Many years ago, when I built my house, I tried to capture more of the heat than usual by building three chimneys of the kind illustrated on Plate 31. Immediately above the fire the smoke passes through eighteen 3" pipes or tubes set in plates, like the tubes of a boiler. These tubes are enclosed in a brick chamber to which air is admitted at the bottom and allowed to escape at the top. On the floor above, the operation is repeated, the same smoke again being conducted through eighteen tubes set in a similar chamber. Photograph 37 is a view of a room having two of these fireplaces. The openings above the mirrors are for the escape of the heated air from the lower of the two heating chambers. The intakes are at the sides of the fireplace near the floor and also from the outside. In this apparatus the mistake was made of not providing sufficiently large openings for the proper circulation of air, so that while it works it does not work efficiently. On the upper floor, where the air openings are larger, the results are better; but to obtain the best results the pipes should stand free in the room. Profiting by this experience, I constructed the fireplace shown in Photograph 38. It is simpler, less expensive, more efficient, and embodies a principle which

SMALL HOUSES



No. 48

Experimental fireplace in dressing-room at "Stone Court."

seems correct. It now remains to improve its appearance. The illustrations on Plates 47 and 51 are intended as moves in that direction.

In the ordinary fireplace the fire is in a recess with an opening of only about 60 degrees. In this one there is no recess, and consequently an opening of 180 degrees. The heat from radiation should therefore be increased by a considerable amount. Of course, all the heat which comes out at the sides is clear gain. The smoke-pipes also heat

the air by contact, and this, too, is gain; so the apparatus should be about twice as efficient as an ordinary open fireplace.

This one was built with some hesitation because it seemed that such an obvious way of obtaining more heat would have been used long ago if practicable, but two seasons' hard use have failed to reveal any serious defects.

Fireplaces and flues are uncertain quantities, except to a gifted few, and perhaps one responsible for so many bad ones as the writer should say nothing about them. Sometimes the best-constructed flue, in which all established rules are most carefully observed, will, for some unaccountable reason, refuse to work perfectly, while, on the other hand, flues which might be thought defective are not so in operation. The study of this matter is a fascinating pursuit which has engaged the attention of many great minds. Benjamin Franklin and Count Rumford were chimney doctors of distinction. The successful chimney doctor is worthy of respect. I once had a fireplace which would not work properly, so called in an expert. He immediately set to work to remove the back, which sloped forward. Many excellent fireplaces are made in that way, as I told him. "Yes," he said, "that is true, but I make my living by taking those things out." Count Rumford's usual remedy for smoky fireplaces was to build a wall at the back, thus reducing the depth of the recess, and such walls often have marvellous effects in improving drafts.

But to return to our subject. The hood of the fireplace of Photograph 38 is supported by angle-irons set in the wall, acting as cantilevers. The area of the pipes is liberal, both to provide a large heating area and so much draft that the smoke may not be easily deflected by air currents in the room and escape from the open sides of the fireplace. Many people would doubtless object to the appearance of the pipes, but there is no good reason why they should not be made ornamental. Pipes are not necessarily ugly. No one objects to the appearance of organ-pipes. Pipes may be beautified in a variety of ways and so form an interesting decorative feature. In the sketch on Plate 48, they are indicated as square. Besides being further removed from the objectionable appearance of ordinary stovepipes, square pipes are easier to decorate and afford greater heating surface.

In the sketch on Plate 51 a sheet-metal hood is substituted for the pipes. This hood is intended to be of either sheet brass or

aluminum, the plates being riveted to small metal angles at the corners of the hood.

Fireplaces of this type are advantageous for use in these houses not only on account of their superior efficiency but because of greater economy in construction. In most of the houses the fireplaces are in the gable-end walls. Walls of sufficient size for strength are not thick enough to conveniently contain the flues. This necessitates either thickening the walls or building breasts, both of which are expensive. Where these fireplaces are used the flues need not extend much below the point of the gable, where it is easy to supply a convenient thickness by corbeling.

Plate 42

The design here presented is very characteristic of this system of planning and construction. The main body of the house is at the back of a court open to the road and flanked by two low projecting wings. The plan illustrates one of the chief economies of



No. 39

House at Bayeux, France.

these designs, that is to say, the small amount of space used for corridors. Also one of the chief characteristics of their arrangement, viz., the segregation of the various departments of the house. It also illustrates the use of the ridge-dormer for lighting interior parts of the building, the bath-room in the left wing being lighted and ventilated in that way. This treatment for the bath-room is often very convenient, for it permits of placing the closets between it and the outer wall, and gives access to the bath-room from the passage, which is a much better arrangement than if the bath-room was against the outer wall, having doors from it to each of the two bedrooms which it separates. It also permits of a better arrangement of doors, leaving a clear wall space in the center of the partition against which the head of the bed may stand.

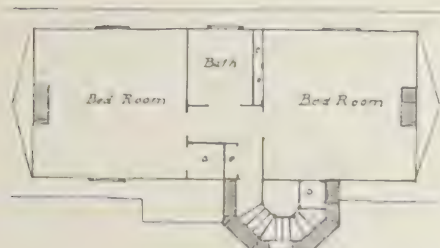
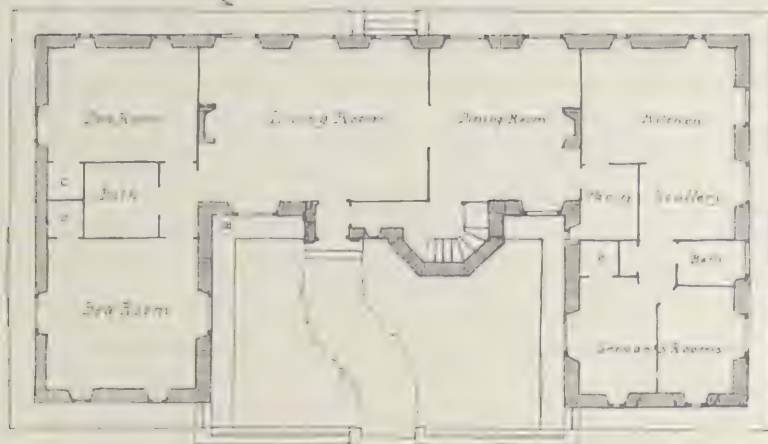
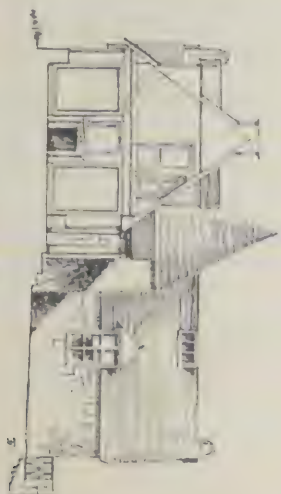
There is an interesting arrangement of stairs in the turret. In this case they start from the dining-room, but that is not necessary, as there might be a partition between the turret and the dining-room. In general it is not a good plan to have stairs start from a room because it is apt to make drafts, but if they do, it had better be the dining-room than the living-room.

This design was suggested by a charming little house which stands on the public square at Bayeux, France, a photograph of which is here reproduced.

Table of Modules

1 m	- 3'-9"
2 "	- 7'-6"
3 "	- 11'-3"
4 "	- 15'
5 "	- 18'-9"
6 "	- 22'-6"
7 "	- 26'-3"
8 "	- 30'
9 "	- 33'-9"
10 "	- 37'-6"
11 "	- 41'-3"
12 "	- 45'
13 "	- 48'-9"
14 "	- 52'-6"
15 "	- 56'-3"

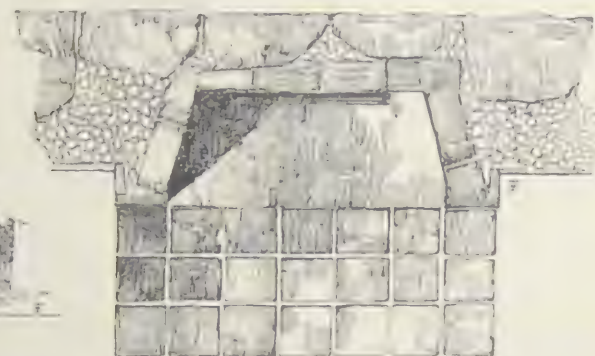
Section on Line A-B of Plan



Plan of Upper Floor



Elevation and Plan of Front Entrance (Scale 1/2 inch = 1 foot)



Chimney and End Elevation
(Scale 1/2 inch = 1 foot)

ADDITIONS

WHY is it that buildings which have been added to from time to time are apt to be so much more interesting than those built at a single stroke, or which have been carried out, from first to last, according to the original plan? To make use of a very splendid example: How immensely does the Palace of the Louvre and Tuileries gain in interest by the vicissitudes of its creation, and how much do the changes and aggrandizements which it has undergone during the centuries add to its impressiveness! Could a structure designed and built at one time have the charm which attaches itself to this superb conglomeration of styles and expedients,



No. 40

Gate House, "Stone Court" from the north.

evolved from the changing wants and fashions of centuries? So, too, with churches. What a world of difference there is, for instance, in the feelings inspired by two such buildings as the Cathedrals of Chartres and Cologne! Yet in the one case we have what may almost be called a patchwork—each patch in the style of the time when made—and in the other, a building carried out completely in accordance with the original plan. Theoretically, the impression produced by the latter building should be better than the former; but actually the reverse is true. How hard, dry, and uninteresting Cologne appears after Chartres, or, indeed, when compared with any other cathedral of the first class where the workman of each succeeding age has labored on it in the style of his time, having regard only to the main features of the original plan. Is it possible to conceive of any place as having been built at a single time and in accordance with a single plan, so impressively romantic, picturesque, and interesting as the monastery of Mt. Saint Michel in Brittany? What a charm attaches itself to many old houses of Europe which have been patched and added to from time to time, as occasion required. Surely this disjointed, haphazard way of building should not produce such good results as the more harmonious method of proceeding in accordance with a preconceived plan made by one person and executed at one time, but that does not always follow.

There must, then, be some good reason or reasons why the more defective method should so often produce the more satisfactory result. One reason may be, that the building made at different times to satisfy different needs has more of the human quality, it

tells a story, it speaks a history; but may not some part, at least, of the explanation lie in the fact that the additions are apt to accommodate the structure better to its site and environment? They are usually planned on the spot, in accordance with the topography and surrounding objects, in a fashion not to be reached where the planning is all done on paper; the building thus seems to grow out of, and belong to, the site, so to speak, and becomes a legitimate part of the landscape.

Plate 43

The little cottage, of this plate, is a house of many additions. Only about twenty years old, it has undergone more vicissitudes than many a more venerable building. The original house was intended as a gardener's lodge. Its plan was in the form of an oblong rectangle, having a small projection at one end for the kitchen. This is the plan of the old stone Huguenot houses of Staten Island, of which several still exist, and its resemblance to those old buildings has led some to mistake it for one. An amusing case of the kind occurred when the minister of the neighboring Moravian congregation told the writer that the house was more than two hundred and fifty years old. As the latter had built it only two years before, the statement was not so impressive as it might have been to one less well informed.

After a few years of use by the gardener another house, in a more convenient place, was built for him, and this one added to so that it might be rented. The first addition was made by utilizing two stone boundary walls, one on the line of the road and one at right angles to it. The wall on the road had a considerable batter, but it did not seem worth while to rebuild it on that account.



No. 41

Gate House, "Stone Court" from Flagg Place.

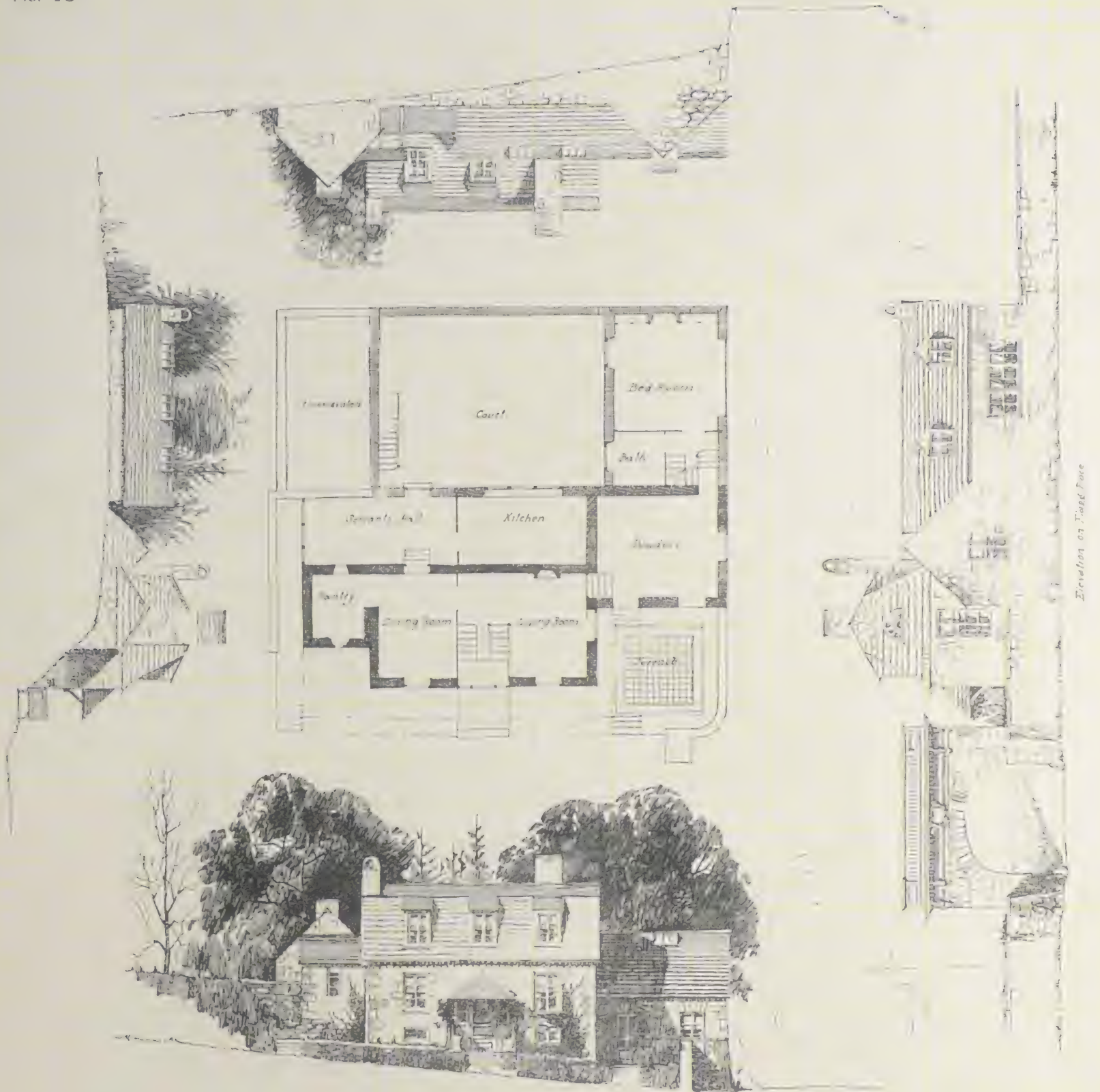
The additions consisted of a servant's room and a living-room. The dining-room of the gardener became the kitchen, his kitchen the scullery, and his living-room the dining-room. It will be seen from the drawings that the main entrance is on the staircase several steps below the floor of the dining-room. As there is another entrance from the outside into the new living-room, visitors have the choice of either door. While one would hardly think of making such a plan for a new house, yet no one who ever lived in this house would have it changed in that respect.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 43

Table of Modules

1 m - 3'-9"
2 " - 7'-6"
3 " - 11'-3"
4 " - 15'-0"
5 " - 18'-9"
6 " - 22'-6"
7 " - 26'-3"
8 " - 30'-0"
9 " - 33'-9"
10 " - 37'-6"
11 " - 41'-3"
12 " - 45'-0"
13 " - 48'-9"
14 " - 52'-6"
15 " - 56'-3"



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As the rooms added had no cellar under them, their floors were kept as close to the ground as possible, and are, therefore, about 3' below the ground floor of the older part of the house.

After a while, the needs of the family which occupied the house having increased, another addition was made. This time also the extension was made along the line of the road, and considerable masonry saved by building on the old retaining wall which supported the bank. Unlike the first addition, this second one had two stories, to provide height for which another drop of about 3', following the slope of the land, was made in the ground-floor level. The new wing contained two bed-rooms and a bath-room (see Photograph 43).

Still another addition is yet to be made. Owing to the several enlargements there is need for better servants' quarters, which the proposed third addition will supply. What is now the servant's room will become the kitchen, as shown on the plan; the present kitchen will be the dining-room, and the present dining-room the entrance-hall. The wing containing the new servants' quarters will stand on the bank at one end of the court, supported by a retaining wall about 7' high, and will be reached from the court by outside steps.

Although the plan of this house has been largely the result of accident, it is not altogether bad, and the house is a favorite with almost every one who knows it. To be sure, it rambles about in a curious way, which no new house legitimately born on a drafting-board of T-square and triangle would be likely to do. But a house of irregular origin planned on the ground, so to speak, by putting on a room here and a wing there to meet a want or suit a condition, might produce a similar effect, that is to say, the appearance of being indigenous to the site. -



No. 42
Gate House, "Stone Court" from the west.

From the foregoing it will be seen, it is hoped, that the object of the writer is not to recommend the making of disjointed and irregular plans, the unnecessary breaking up of floor levels, and, least of all, the straining after effects or any other form of affectation, but simply to call attention to the fact, too often overlooked, that much better results than usual may often be had by planning in the open on the soil itself; for in that way one can best fit the building to the site, make it appear to belong to the spot and blend with the landscape.



No. 43
Gate House—east wing.

CERTAINTY

IN the essay on Design, certainty is classed as an essential element of good design, but the term is there used in a somewhat negative sense, for besides its evident meaning it is intended to signify the absence of qualities inconsistent with good design, as uncertainty, hesitation, obscurity, instability, etc.

There is both a positive and a negative way of teaching art; the student may be told what to do to achieve success, or what not to do to avoid error. Some writers take the ground that as a good artist cannot be made by word of mouth, the next best thing is to warn the student against errors which, if committed, will surely make a bad one.

But is it certain that good artists cannot be made by word of mouth? The whole theory of this work is based on a contrary assumption, and if that theory is right it ought to produce better results, for a positive attitude in teaching is more inspiring than a negative one. This is not intended to mean, however, that common errors should be neglected.

To train the eye and control the hand are essential requisites in all branches of art, and these are things within the power of the individual to obtain. He may be told how to proceed and need only supply the necessary patience, pains, and perseverance. With these he will certainly succeed to the extent of his talent, and talent often is, as some one has said, nine parts patience and care to one part endowment.

To make a draftsman, practice is necessary, and the best of all practice is to draw the human form.

To make an artist requires an appreciation of beauty. Great art consists in the interpretation of beauty in nature, which must not be confused with realistic portraiture—a totally different thing. Greek art was of the former kind, and the example of Greece shows that the way to great art lies in the study of human beauty—a self-evident truth, one would think, for if familiarity with the most beautiful design of Omnipotence cannot inspire one, what can?

There is, then, a royal road to art, free to all; but so difficult to find, when looked for in the wrong place that whole centuries may pass without the production of a single artist in the highest meaning of the term, but so broad and open when sought in the right direction that a whole nation may follow it, as did the Greeks.

The primary object in this essay is, however, to point out certain common faults in design.

One chief cause of error is, of course, lack of thorough study. This applies especially to architecture. In painting, the work is seen in face, and defects present themselves in full view. In sculpture the object must necessarily be studied from all sides in the making, though unpleasant surprises sometimes occur when it is put in place because the artist had not sufficiently taken into account all the angles from which it would be seen. In architecture this danger is much greater, because the drawings being for the most part simple projections, the design is not shown completely in any one, and is not so easy to study in the making as is the work of the painter or sculptor. In designing, therefore, the architect must constantly check up what he is doing by means of perspective drawings made with great accuracy, or with models. The latter are, of course, preferable because they may be viewed from every angle, but models are not always practicable because of their great cost.

Apparent lack of stability is a common fault in architecture, and one which is daily becoming more noticeable with the more frequent use of steel and other supports hid from view and overlaid with masonry or other material which pretends to support, while itself being supported.

In the same category belong that great class of errors due to lack of balance. Sometimes this is simply a defect in design of the kind referred to in another essay, and sometimes an apparent defect in construction also, as where visible supports are not direct from the ground up, and hence do not satisfy the mind, or where the axis of the thing supported does not coincide with its support, as a statue with its pedestal (see Photograph 44). Examples of this kind abound in New York, and indicate either a lack of harmony between the sculptor and architect or else gross ignorance in both of a fundamental principle in design. Indeed, much of the sculptural decoration of buildings, in this country, is so much at variance with the architecture that, though intended as ornament, it constitutes a blemish.

Another great class of errors is due to lack of frankness; as where things are almost but not quite what they set out to be, such as almost a square, almost a circle, almost a straight line. To satisfy the eye they should be one thing or the other. If a feature is on axis it should be truly on axis or frankly off it. Frankness, simplicity and directness are aids to certainty, and all are founded on common sense.

Still another class of errors is due to lack of truth, where things pretend to be what they are not, and where deception seems to be the governing principle; but this is a matter to which a separate essay has been devoted.

Another category of error is due to a lack of the sense of propriety or proportion. The designer often seems bereft of that innate sense of the fitness of things which is such a conspicuous characteristic of most French art.

There is a custom in the navy which might with great advantage be applied to design, and especially to architecture. In the navy everything is rated according to its importance. A high officer rates certain accommodations which one of lower rank does not receive; a large ship may rate a full band while a smaller one may rate nothing more musical than the boatswain's whistle; and so it should be in architecture. Important buildings should rate features not found in unimportant ones. In France monumental buildings are monumental, both inside and out, containing apartments appropriate to their size and magnificence. On entering a building of importance in France, one generally finds himself in a *salle des pas perdus*, com-



No. 44

Columbus Monument, New York.
Axis of statue does not coincide
with that of its support.

SMALL HOUSES

mensurate with what his imagination might lead him to expect; while here, in many government buildings or other imposing structures, he is greeted with nothing more impressive than a corridor, and finds no pieces of sufficient size and grandeur to keep the interior in countenance with the exterior. On the other hand, in some cottage he may find a huge hall or room out of all proportion with the exterior and dwarfing into insignificance the other rooms.

These and many more mistakes in design are due to a lack of knowledge or observance of the fundamental rules of good design with which all students ought to be familiar—principles which are so conspicuously present in the human form, at its best, that he who appreciates it can hardly go wrong in the design of other things.

As has been repeatedly stated in these essays, history shows that the art instinct manifests itself in all branches of design precisely in proportion to the intensity of the study of nature's master-key to art—that where the beauties of the human form are understood beauty abounds in the design of all other things. The most abundant evidence of this exists not only in the case of Greece but also in that of every great artistic movement. The innumerable existing drawings by the great masters of the Renaissance show how diligently those men studied the beauties of the human form, and the facility and success with which they could turn their hand to all branches of art, whether of painting, sculpture, or architecture, show that in this study they had, in fact, grasped the veritable key to art.

Although the road to great art is simple and straight, like the proverbial way to heaven, it is beset with many difficulties and few there be that find it. Probably the greatest difficulty is the general misconception of what constitutes the most enduring kind of art,

that is to say, to lack of appreciation of the predominant rôle which beauty plays in it.

There are all kinds of art, but art which is eternal is founded on beauty. Design without beauty is like music without melody—interesting perhaps for those who like it, but not a joy forever.

Plate 44

This design is for a pair of twin houses. The arrangement was suggested by a peculiarity of site. On the spot there is an artificial mound, made many years ago by dumping earth on the slope of the hill, forming a pile which looks like the beginning of a causeway. As the ground falls away, the height of the pile increases until at about 8' it abruptly stops.

It is now proposed to place a house at either side of the pile and use it to form a terrace between them, as indicated on the drawing. The plan has several advantages, viz.: it is novel and interesting, permits of a better and more useful basement story than one sunk in the ground, makes a very fine approach to the houses, and for the mere cost of a retaining wall produces an imposing effect besides saving a lot of grading.

The houses are entered from the terrace, and each one has on the main floor, besides the entry, a living-room, dining-room, pantry, also a fine bed-room and bath. In the basement, which is entirely out of ground on two sides, is the service department including sleeping-rooms. On the first floor, which in this case is in the roof story, are three more masters' bed-rooms and a bath.

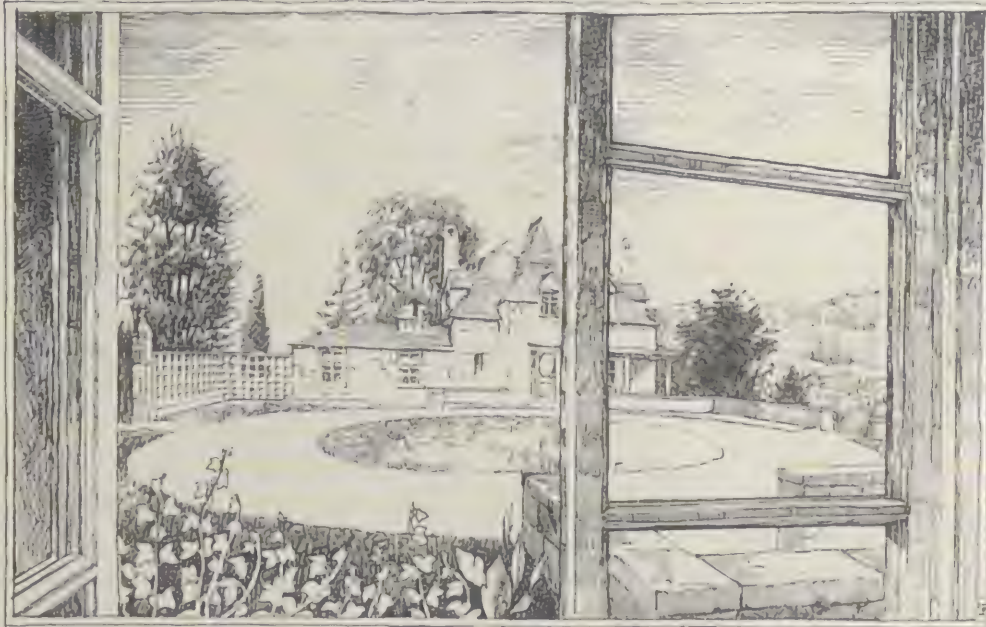
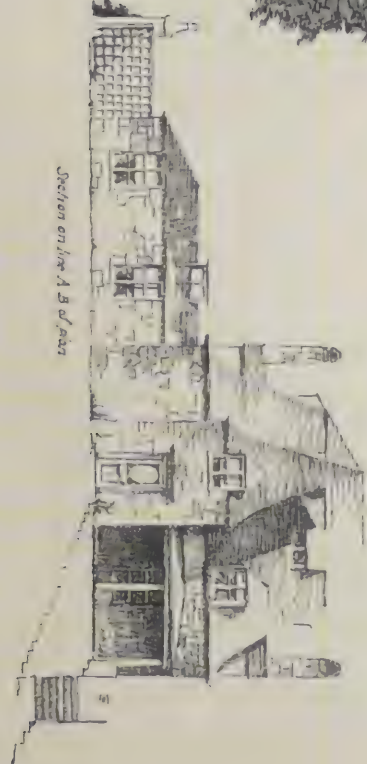
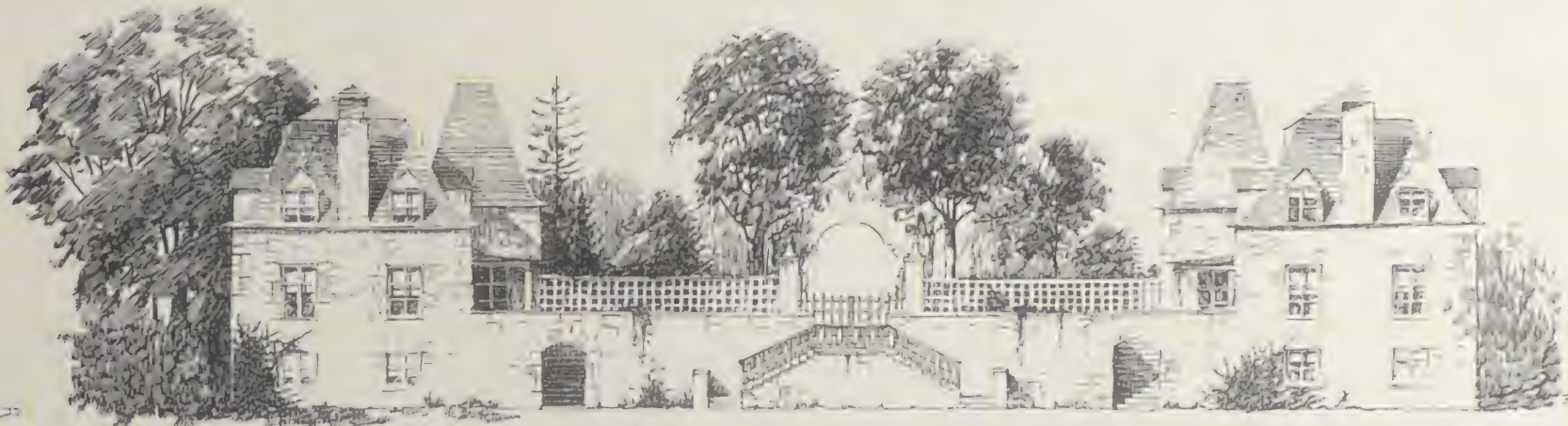
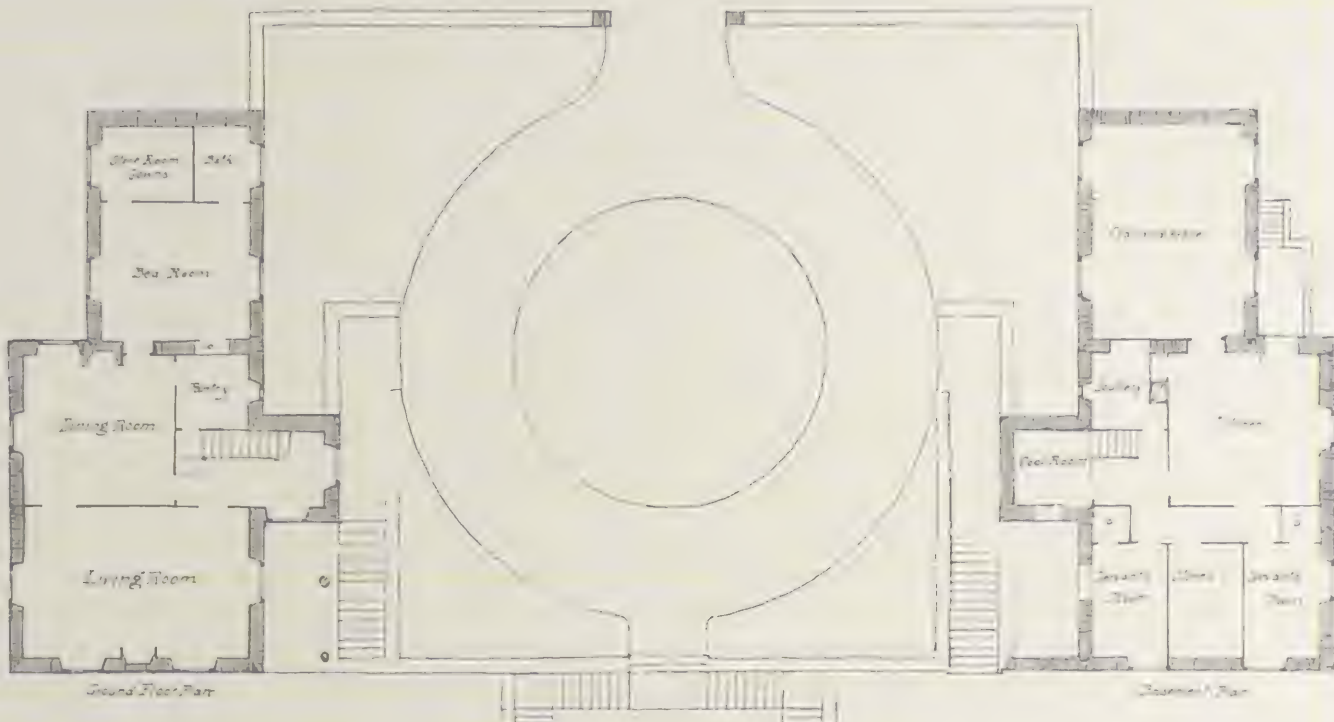
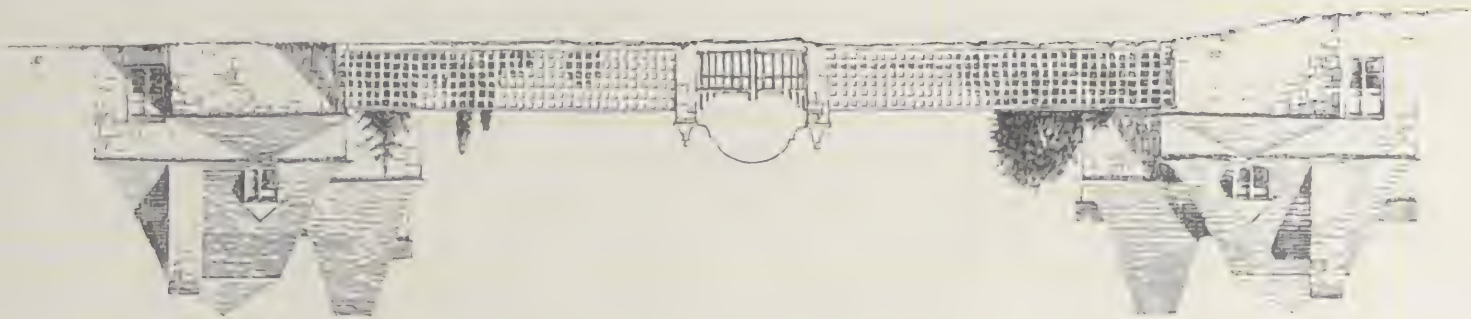
The buildings will stand about 100' back from a public highway and be approached from the rear by a private road. The location is most picturesque, overlooking the golf course of the Richmond County Country Club, than which there is none more beautiful in the country.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 44

Table of Modules

1	m	-	3'-9"
2	"	-	7'-6"
3	"	-	11'-3"
4	"	-	15'-0"
5	"	-	18'-9"
6	"	-	22'-6"
7	"	-	26'-3"
8	"	-	30'-0"
9	"	-	33'-9"
10	"	-	37'-6"
11	"	-	41'-3"
12	"	-	45'-0"
13	"	-	48'-9"
14	"	-	52'-6"
15	"	-	56'-3"



DRAWING

THE notion that one must be endowed with special talent in order to draw is a pernicious belief greatly in public interest to combat, for it discourages many from persevering in the pursuit of a most valuable and important acquirement well within their reach.

Drawing improves craftsmanship and increases national wealth. The mastery of the hand should have a most important place in the training of the human being, and one cannot do better for humanity than to propagate that belief. Drawing is a means of expression and a highly important one. Most people express themselves by speaking and writing only; drawing is a third way, and the person without that ability labors under a much heavier handicap than he is generally aware of. One who can express himself by drawing finds occasion to do so constantly, and has a great advantage over him who cannot. To the person who has anything to make, the ability to draw is invaluable, and how much more would be made if more people had the power to draw. Many would gladly persevere in learning to draw if they only knew, what is perfectly true, that the ability to do so is theirs, that they need no special talent and, for the most part, no other teaching than they can give themselves by a close observation of nature.

It has been truly said that it is just as unusual to be born without a nose as without the power to draw. What is lacking is not the ability but the perseverance necessary to acquire sufficient mastery over the movements of the hand to compel it to do what the mind directs.

Another old saying, and a very true one, is that there are three rules for learning to draw: the first is to draw, the second is to draw, and the third is to draw. Which is only another way of saying that an obedient hand can only be had by practice. How true this is may be seen in the length of time it takes the child to acquire ease and rapidity in writing. Years pass before the handwriting is thoroughly formed, and the same is true of drawing, for facility in both are alike dependent on practice; but neither practice in writing nor practice in drawing, without pains, is likely to produce good results.

In learning to write one takes a long step toward the control of the hand. To be sure, he has learned to make and combine only twenty-six letters, and that is little in comparison with what must be done in drawing, but in learning to write the hand has been brought under subjection to the mind, or broken in, so to speak, and the way prepared for further accomplishment.

In learning to draw, of course, it is not the hand only which must be trained but the eye also, and both alike require practice—practice with little else except pains. With practice and pains a time will come when a certain pride and pleasure will be taken in results, and when that happens the way is clear and the hardest part of the road passed; but the road is hard only for those who have not been properly encouraged to draw from childhood. The child may be taught to draw just as he is taught to speak. He speaks by imitation and will draw in the same way, if properly encouraged, and acquire mastery over the movements of the hand just as he acquires mastery over the movements of the tongue. The small child likes to draw quite as well as he likes to speak, but is seldom given the

same opportunity. Paper and pencils should be always within his reach, then slight encouragement will make a draftsman if not an artist of almost any child.

Difficult as it is to train the hand, it is still more difficult to train the eye so that the hand may receive proper direction and the lines be placed where they belong. In making drawings of the kind herein contained, that difficulty is in large measure overcome by the presence of the squares.

Before beginning to make these plates, the writer had had comparatively little experience in free-hand drawing, and none at all in pen-and-ink work, but the squares so simplified matters that it was easy to indicate what was necessary in order to express the meaning, and results were highly pleasing. After having made a number of plates, however, the last appeared so much better than the first that the latter were done over again, only to find later that these, too, might easily be improved. This process of discarding and remaking the plates happened so many times that the discards now far outnumber those retained, and while it is painfully evident that the process might with advantage have been carried further, a stop had to be made somewhere. Moreover, the prime object here is to illustrate the text, and the quality of the drawings, after that is accomplished, is of secondary importance. The laborious process by which these drawings were made was the penalty for lack of training in youth. At sixty one learns new tricks with difficulty.

In striking contrast with this experience is that of my daughter Betsy, to whom I am indebted for the charming little human figures which add so much of life, interest, and scale to the perspectives. She learned to draw unconsciously in the same manner and almost at the same time she learned to speak, and without any other lessons than those obtained in observing nature. Like most young children she took delight in pencil and paper, and great care was taken to keep her always supplied with, and encouraged to use, them; but no instruction was given for fear of converting a pleasure into a task. In this way her self-training began before she was three, and has continued without intermission. With constant practice she soon obtained control over her hand, so that to learn to write was scarcely an effort, and so well was it done that lessons in handwriting at school were soon dropped. Now she has arrived at a stage when instruction in drawing will be a pleasure of great value.

Most people ascribe to talent what is here due simply to proper training, and there can be little doubt that similar methods would produce similar results in other cases.

Plate 45

The two designs of this plate represent two very different forms of plan, one approaching the square and the other long drawn out.

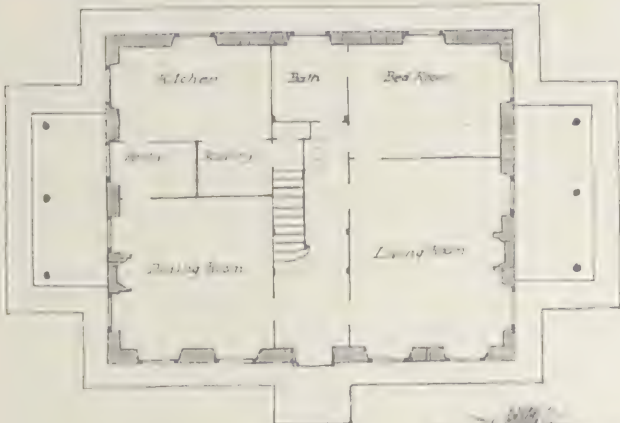
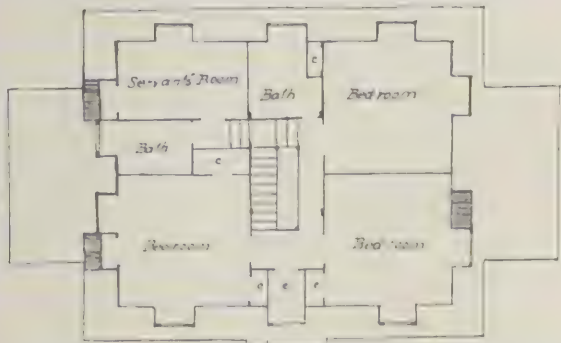
House *A* would, of course, require a great deal less wall than House *B*. It has, in fact, thirty-six running modules of wall as against forty-eight in House *B*. Moreover, in House *B* the walls are higher and there are two large independent chimney stacks. So the masonry required for House *B* would be at least 50 per cent more than for House *A*. The masonry is, of course, only a part of the total cost and not as large a part as one unacquainted with building

No. 45

Table of Modules

1	-	3'-9"
2	-	7'-6"
3	-	11'-3"
4	-	15'
5	-	18'-9"
6	-	22'-6"
7	-	26'-3"
8	-	30'
9	-	33'-9"
10	-	37'-6"
11	-	41'-3"
12	-	45'
13	-	48'-9"
14	-	52'-6"
15	-	56'-3"

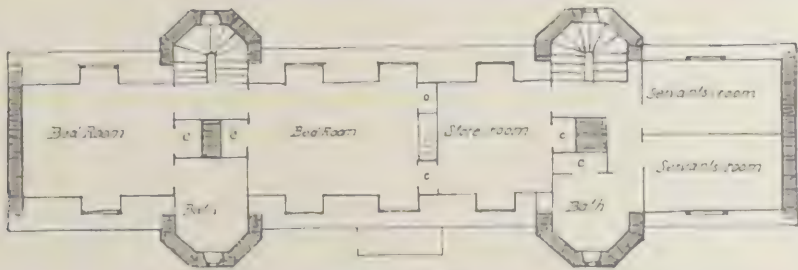
HOUSE A.



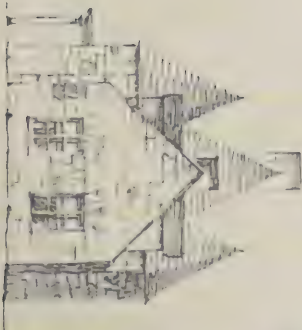
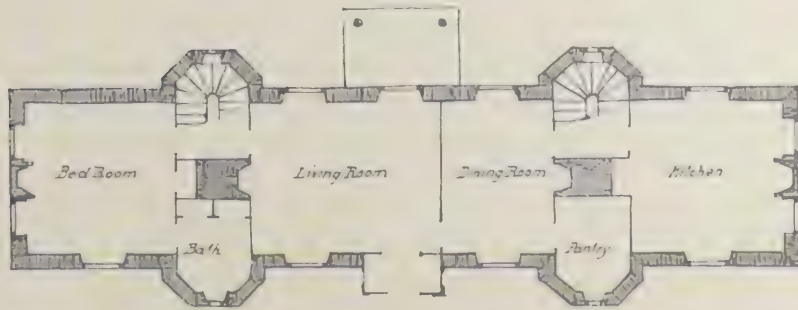
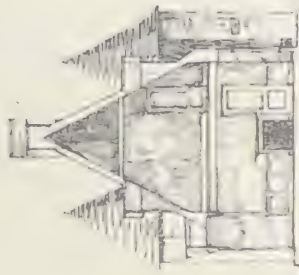
Plan of Upper Floor



HOUSE B.



Plan of upper floor



SMALL HOUSES

might suppose. Nevertheless House *B* should cost considerably more than House *A*, although the accommodations afforded by each are about the same, which difference in cost may be considered as the price which must be paid for the more picturesque appearance of House *B*.

In House *B* the rooms all have, or are capable of having, light on two sides, which is an advantage or a disadvantage according

to one's taste. It is an arrangement which permits of more sunlight than any other and should produce a more sanitary house.

House *B* has the advantage of a more liberal entry, to reach which one is not obliged to pass through the living-room. Both in plan and elevation House *A* is of a more modern type than House *B*, and in some respects a more convenient one, but what it gains in this way it loses in picturesqueness.

COLOR bears somewhat the same relationship to form that music does to language. Music may be gay or doleful, triumphant or plaintive, but beyond this not much meaning can be expressed except by the use of words. So, too, colors may be bright or sombre, cheerful or sad, but they cannot express more except by the use of form. Like music, color makes its strongest appeal to the emotions, while language and form appeal both to the intellect and the emotions. Music may, therefore, be called an adjunct to language and color an adjunct to form. Each may be used to heighten the effect of the other by calling into play additional qualities of mind and feeling.

In nature there is no conflict between color and form, there is color in everything, complementing and beautifying the forms, and colors should of course be used in this way in design, that is, to add distinctness and greater beauty to form. Form is, however, of vastly more importance than color, being of higher intellectual order and appealing to a higher degree of intelligence.

In this country, unfortunately, more attention is generally paid to color than form. One sees this strikingly illustrated in decoration. How few there are, even among the supposedly well educated, who really care much what the forms in a room may be, provided the color scheme is harmonious, agreeable, and restful to the eye. Whether the proportions of the architectural details are just or the profiles pure, are matters of little concern. Color interests them, and is a thing they feel they can understand and appreciate. Yet form should be of much greater consequence than color, and will be so regarded when we have advanced sufficiently in refinement and art. This is by no means to belittle the value of color. Beautiful and harmonious coloring is of very great importance, but beauty of form still more so. Many people who, through lack of a cultivated taste, do not recognize this truth when applied to inanimate objects, are quick to see it when applied to living things. They do not recognize as beautiful the misshapen human being, or animal, be his coloring what it may.

Charles Blanc, in his "*Grammaire des Arts du Dessin*," calls attention to the fact that the lower down in the scale of civilization one goes the more stress is laid on color and the less on form. The African negro and savage delight in color and care nothing for form; but as people advance in art and refinement, appreciation of form constantly increases until, as with the ancient Greeks, it altogether predominates. All through nature the same rule, in a general way, holds good among living creatures. The lower the form of life the more striking is the coloring apt to be. Shell-fish, butterflies, birds, and many other things in the lower grades of creation, have gorgeous and beautiful coloring; but as intelligence increases, the less color counts and the more beauty depends on form, until in man form is supreme. Monsieur Blanc was of the opinion that a people's progress in refinement may be gaged by the relative degree of importance it attaches to beauty of form over color.

Color, as has been said, when properly used may add immensely to the beauty and also to the distinctness of form. It is not surprising, therefore, to find that the ancient Greeks, who excelled all people in art, used color on their buildings. It is unfortunate we do not know exactly how it was done. The indications are that crude bright colors were employed, but they must have been used

without conflict and in ways which immensely heightened the beauty of the architecture. Nature shows us, on every hand, that bright strong colors are capable of producing more strikingly beautiful results than subdued tints, but nature uses such colors in ways which are always harmonious. May not the ancient Greeks have discovered this secret? One way of obtaining good results with strong colors is to use them in small patches. We see a flower-bed filled with strong colors of every hue, yet there is nothing to offend the eye. The glorious glass of the twelfth and thirteen centuries is of the crudest colors in sharp contrast, to which the light gives great brilliancy, yet the result is superbly beautiful and harmonious. Mediæval and Renaissance builders decorated their beam ceilings with the strongest colors, taking care, however, to use them in small patches, and obtained results of great beauty. Oriental people often use the strongest colors, obtaining wonderful and artistic effects. Whoever thinks of the books in a bookcase as inharmonious, though the bindings may be of the strongest colors mixed together indiscriminately? It would seem, therefore, that very strong hues may be used together, in small patches, with telling effect. When it comes to dealing with larger areas of strong color in juxtaposition the case is different, even when placed in proper relationship (as where complementary colors meet), the effect is apt to be harsh and disagreeable, but when such colors occur in nature that does not happen. The strong greens of foliage may be seen against an intensely blue sky and, so far from being disagreeable, the effect may be surpassingly beautiful. In sunset and sunrise one sees the most brilliant coloring—brilliant and strong beyond the power of man to imitate—producing effects of the most exquisite beauty. In such cases, however, there is usually a gradual blending or gradation from one color to another.

While strong colors are generally dangerous to use in juxtaposition, it seems evident that they might be used that way if one only had the skill to do so properly, and that finer effects might thus be produced than by the use of softer shades.

In decorating the houses we are here considering, if the interior woodwork is treated in the way recommended, viz., by the use of wax on the natural wood, the color of the wood will to a certain extent govern. The natural color of wood is apt to be somber and becomes more so with time—so it stands in need of enlivenment. It was doubtless this reason which prompted the mediæval and early Renaissance architects to decorate their ceiling beams with bright colors in stenciled designs. When well done, this is an interesting and attractive treatment; but it is, perhaps, beset with too many difficulties for general use. Whatever treatment is used, it is devoutly to be hoped that one very common American practice will be avoided, that is, the staining of wood. Stain and varnish alike disguise and detract from the natural beauty of woodwork, and should not be used for interior finish where the finest result is desired. Wax is the best of all finish for furniture and other interior woodwork, and also the most economical both in first cost and subsequent maintenance.

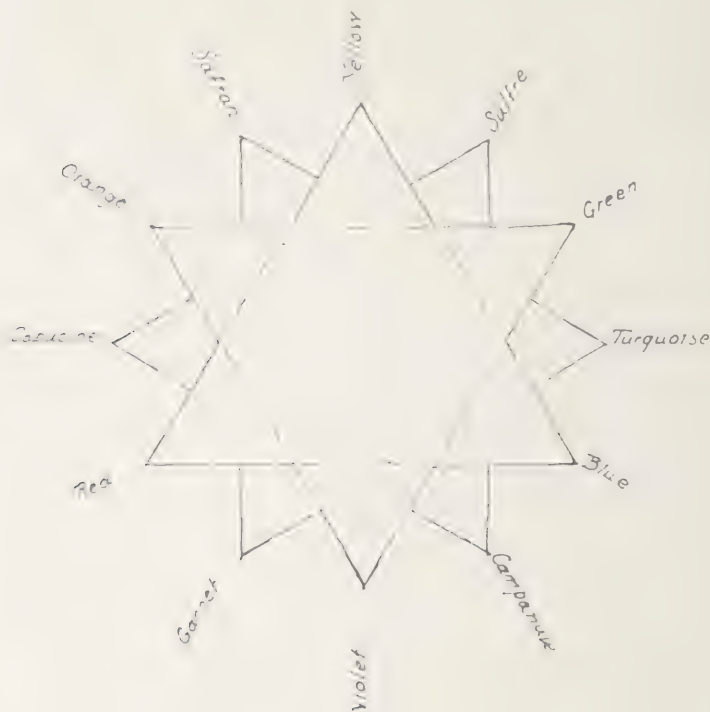
Where the decoration is to depend largely upon pictures and other objects attached to, or suspended on, the walls, plain and unobtrusive colors are best, as affording the most satisfactory background; this also applies to paneled rooms where the forms of the

SMALL HOUSES

panels constitute an important element in the scheme of decoration. But when the walls are comparatively bare, the decorative effect can best and most easily be had by wall-papers, many of which are extremely beautiful both in design and coloring. It is by no means true that the best effects may be had, as some seem to think, by adhering, in general, to a single color. That kind of treatment may produce monotony and lack of interest. Agreeable harmony and variety of color, such as one sees everywhere in nature, should produce the best results, in obtaining which it is important that the decorator should understand the law of complementary colors, and so be able both to avoid discord and heighten beauty. For this reason we give Monsieur Chevreul's diagram with a brief description.

DESCRIPTION

If one combines two primary colors, yellow and blue, for example, to compose green, this color will attain its maximum intensity when in juxtaposition with its complementary color, red, which is opposite on the diagram. Also if one combines yellow and red to compose orange, this color will be intensified by the neighborhood of the opposite color on the diagram—blue. Finally, if red and blue are com-



bined to make violet, this color will be benefited by immediate contact with its opposite on the diagram—yellow. This reciprocal exaltation of complementary colors in juxtaposition, Monsieur Chevreul calls “the law of simultaneous contrast of colors.” A strange phenomenon is here presented: These same colors, which are exalted and intensified by juxtaposition, are destroyed by mixing. If green and red in equal quantities and of equal intensity are mixed, the two are annihilated, one by the other, and a colorless gray is produced. Or if mixed in this way, in liquid form, and light passed through the mixture, the emerging rays are colorless. The same thing happens when any two colors which stand opposite on the diagram are so mixed. This annihilation of complementary colors by admixture is called “achromatism.”

When these laws are understood it is easy to select the most pleasing combinations and avoid jarring contrasts. To find which color should best be used with another, one has simply to consult the diagram and see what stands opposite; thus yellow with violet, sulphur with garnet, green with red, and so on. This mixture of

two adjoining shades on the diagram may be continued to any desired extent; they will always be complementary to a mixture of the same sort on the opposite side of the figure; but there are other things to bear in mind:

When two shades of the same color are placed together each affects the other. If squares tinted with different intensities of India ink are placed in a row, in regular gradation from the darkest to the lightest, then each square will be seen to be modified by the one next to it. The edge next a darker square will appear lightened and the edge next a lighter square darkened, so that from a little distance the row of squares will not seem flat but fluted. Also hues or contrasting colors, when placed together, affect each other. Look upon a blue and a yellow and in a little while both will appear green. Take a blue square and observe it; take a red square and observe it, place them side by side, then the red square where it meets the blue will have a red tinge and the corresponding edge of the blue square a greenish tinge. That is because every color tends to suggest its opposite (or complement). The eye, fatigued with one color is disposed to receive the impression of its complement, so if one is to judge well between many different shades of the same color, he should occasionally rest the eye by a sight of its complement. The painter knows that if he places even the very purest of certain colors side by side they look muddy. They spoil each other by the complements which they suggest.

For house decoration dark paper absorbs too much light; red and violet spoil the color of the skin; orange is too intense. Yellow and light tones of green and blue are best. Yellow goes well with mahogany furniture, but hurts gilding. Light green helps both. Light blue is not bad with mahogany and greatly helps gilding. It also combines well with yellow and orange woods. A gray pattern and white ground, pretty evenly balanced, is strongly recommended by Mr. Chevreul, who also gives it as a rule that the covering of furniture and the window curtains should be complementary to the color of the walls. A carpet should be chosen by the same rule to give distinctness of effect to the furniture; green and black being better colors under mahogany than red, scarlet, or orange. For mahogany chairs green covers are good. In small rooms a harmony may be sought by carrying throughout an analogy of color, the contrasts being in hues of the same color, but in large rooms the contrast of colors produces the best effect.

Plate 46

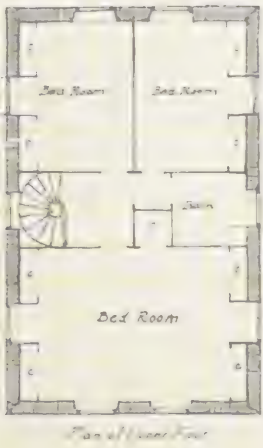
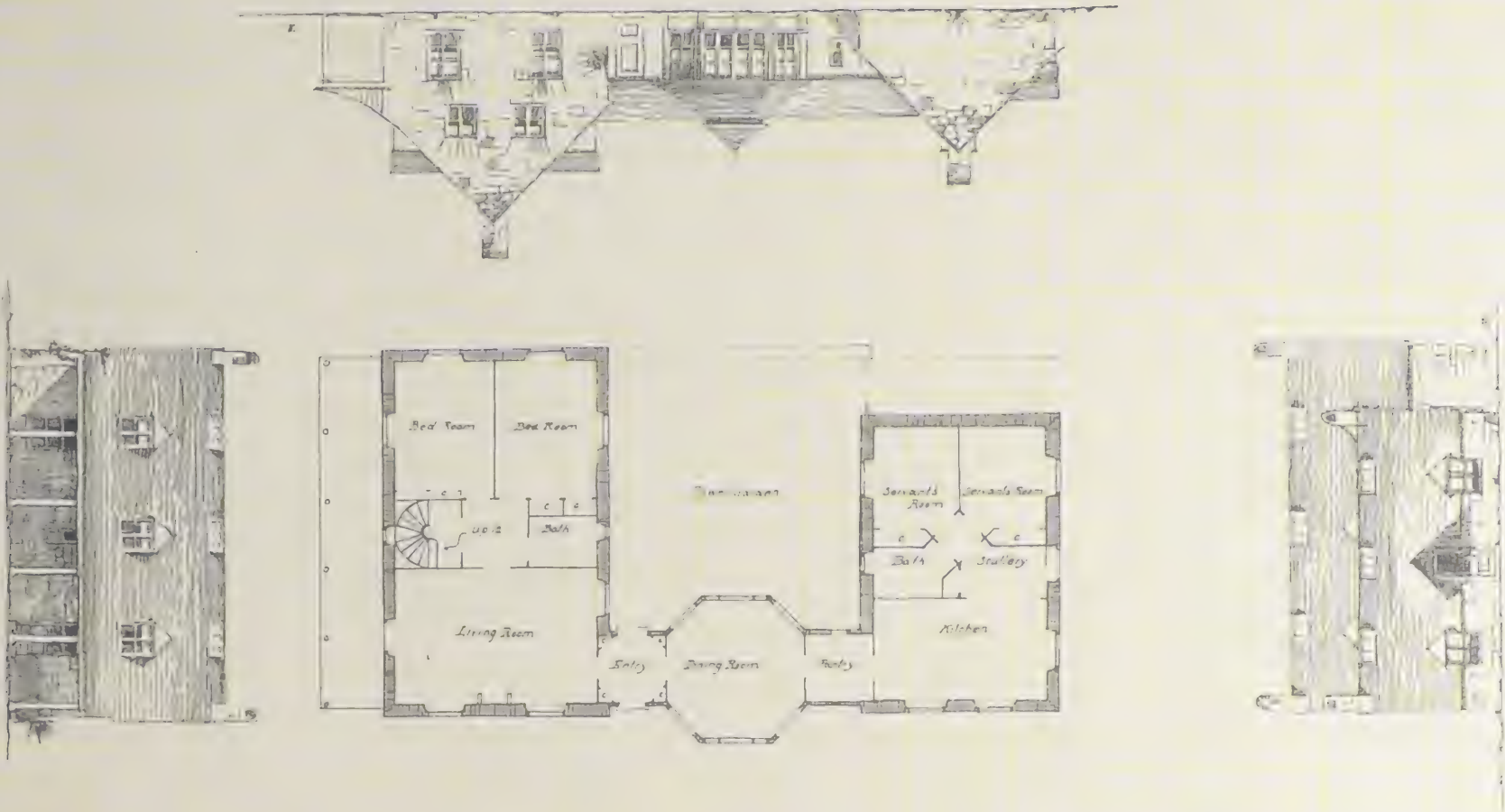
In none of these designs is the segregation of the different departments of the home more perfectly secured than here. The building consists of three parts: the main body containing the rooms used exclusively by the family; the wing or outbuilding parallel to it, devoted entirely to the service department, and the connecting link, containing the part used by the family and to which the servants, in the performance of their duties, must have most frequent access. The dining-room occupies the center of this connecting link. It is an octagonal construction with a pointed roof. The room has a most pleasant aspect, its bowed windows on one side overlooking the court and on the other side the garden. The unpretentious entry between living-room and dining-room gives both upon court and garden. The main body of the house contains, on the ground floor, the living-room, two bed-rooms, and a bath-room; while the entire upper floor is occupied by two more bed-rooms and a bath-room, each provided with a pair of ridge-dormers. The verandah extends along one side of this part of the house.

House for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 46

Table of Modules

- 1 m - 3'-9"
- 2 " - 7'-6"
- 3 " - 11'-3"
- 4 " - 15'-0"
- 5 " - 18'-9"
- 6 " - 22'-6"
- 7 " - 26'-3"
- 8 " - 30'-0"
- 9 " - 33'-9"
- 10 " - 37'-6"
- 11 " - 41'-3"
- 12 " - 45'-0"
- 13 " - 48'-9"
- 14 " - 52'-6"
- 15 " - 56'-3"



CONTRAST

THE value of contrast in design need not be dwelt upon; suffice it to say that contrast tends toward variety and interest, and the lack of it toward monotony and dullness.

When two things are compared, the one is measured by the other. Contrast, therefore, is a gage of value. As in architecture, scale is used to impress the imagination with magnitudes, so in all branches of design contrast is used to accentuate values. Contrast, indeed, forms much of the stock in trade of the skilful designer, and the more skilful he is the more he appreciates its value. Rembrandt shows what it is possible to do by contrasts in light and shade, and nature spreads out before us in endless variety contrasts between foreground, middle plane, and distance, sunlight and shadow, together with contrasts in color in endless variety.

While a pupil at the École des Beaux Arts, I was once working on a design which I was desirous of making very rich, and with that object, made too liberal use of columns and other ornamental features. When the "patron" * saw it he asked why there were so many. He said: "You think you are making it rich, but what you are doing has precisely the contrary effect. To obtain richness there must be contrast. Where all is ornament, ornament has no value." Here is a lesson of which many architects of high standing in this country are sadly in need. On every hand, in the most important buildings, one sees ornament without contrast—richness overdone; rich materials and details used as if they were of no value, and, indeed, to use them in this way is to deprive them of a large part of their value. Where there is no contrast, that is to say, no immediate measure of value, no aid is furnished to the imagination by which to grasp the effect sought to be conveyed, and the outlay is, therefore, in large measure lost.

Of course, imagination plays a large part in the estimate of any work, and immediate contrast is not always necessary in order to gage values, but where such contrast can be presented the effect should be more striking and impressive than without it. A rich portico standing against a comparatively plain wall surface appears much more worthy of admiration than if against a background of equal richness. A precious object should have an appropriate setting, otherwise its value is not accentuated. Pictures in a gallery, even if by the greatest masters, lose much in value if huddled together.

The comparatively plain wall surface of the central part of the Capitol at Washington affords a much-needed foil to the richness of the porticoes and the over-ornamented wings; but

there are those so lacking in taste as to regard the comparative sobriety of the older part of the building as a defect, and it has been seriously proposed to enclose it with columns. When that happens the structure will lose much of its richness and value as an artistic production.

Quantity has a direct effect on value in design as in other things.

It is said that when emeralds were first discovered in America, a Spaniard carried one to a lapidary in Italy and asked him how much it was worth; he was told a hundred *escudos*. He produced a second, which was larger, and that was valued at three hundred. Overjoyed at this, he took the lapidary to his lodging and showed him a chest full; but the Italian, seeing so many, dampened his joy by saying: "Ah, ah, señor, so many! These are worth one *escudo*."

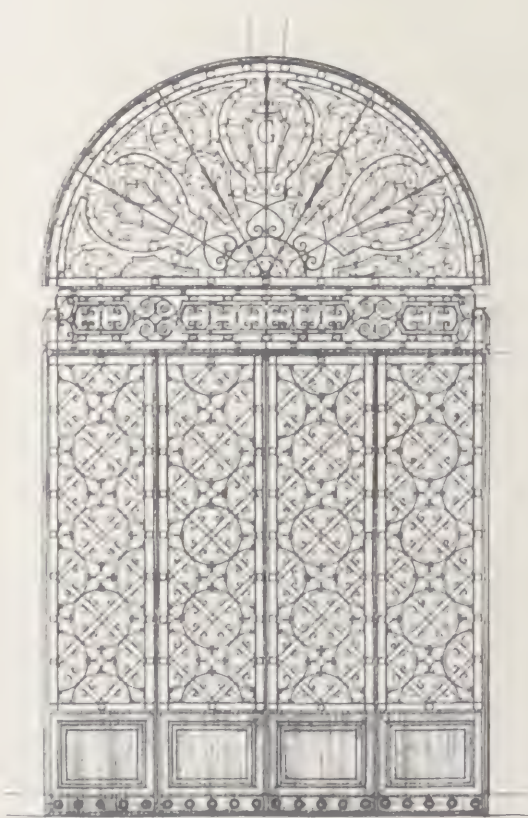
When rich details, valuable marbles, and other precious materials are used with such lavishness and indiscrimination as in many of our modern buildings, they often kill themselves and appear cheap by their great abundance, and thus defeat the very object for which they were used. In some of the most important buildings of New York large areas of wall surface, often in places of secondary importance, are overlaid with marble or other precious materials brought from the ends of the earth, with the result that not one person in a thousand who passes has any idea of the outlay involved and naturally supposes that materials used with such freedom must be of little worth, while those who do recognize their value are much more likely to be filled with disgust at the useless waste than with the admiration it was intended to excite. Much less of this valuable material used with proper discrimination and contrast might better secure the effect sought.

Contrast is of the very essence of design, applicable to all things connected therewith, great or small, and should always be employed if full values are to be brought out. The curved line needs the counter curve; the circle, contrast with the square (see Photograph 45); the molded surface with the plane; shadows against light; ornament against areas devoid of it. In profiling, every molding must be separated from its neighbors by flat fillets, curved moldings contrasted with angular, and so on, all the way through.

By contrast, the effect of ornament may often be increased many-fold. A rich feature, though comparatively small, standing in contrast against a plain wall surface, may impart an air of refined richness to the whole design. In Spanish architecture one often sees this principle carried to extremes, as where a doorway of barbaric richness stands against a perfectly plain wall. But interesting and instructive as such examples are, better results may be obtained by using the same principle with greater sobriety.

One of the best examples of this kind with which the writer is familiar, is at Rome in the College Sapienza. In this design one sees the hand of the giant in art, and is not surprised to learn that no less a personage than Michael Angelo was responsible for it. Surely, in no other work by him does his genius more brightly shine. What tremendous importance is here given to the majestic doorway by the comparatively blank wall against which it stands, and how clearly it is manifest that any further ornamentation of the lower story would only serve to detract from the richness which the design receives from this one point of accent (see Photograph 46).

The lesson which this design teaches should be of great value to the designer of small houses, for it demonstrates most conclusively



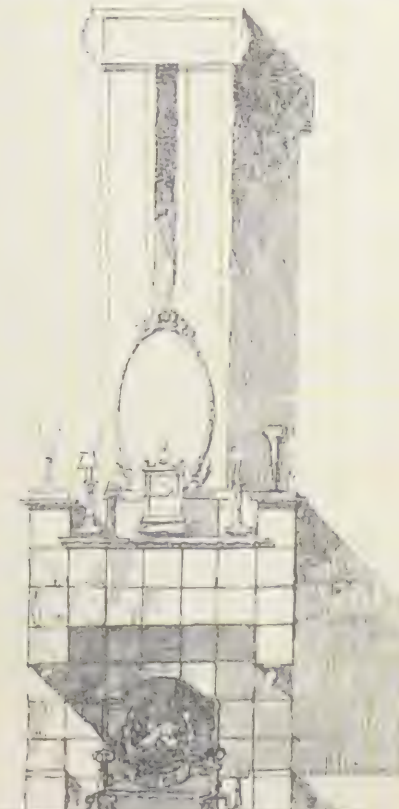
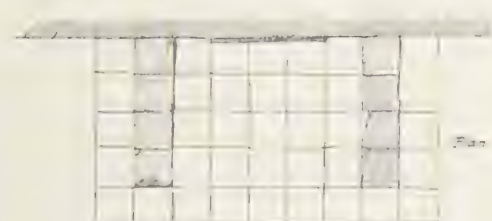
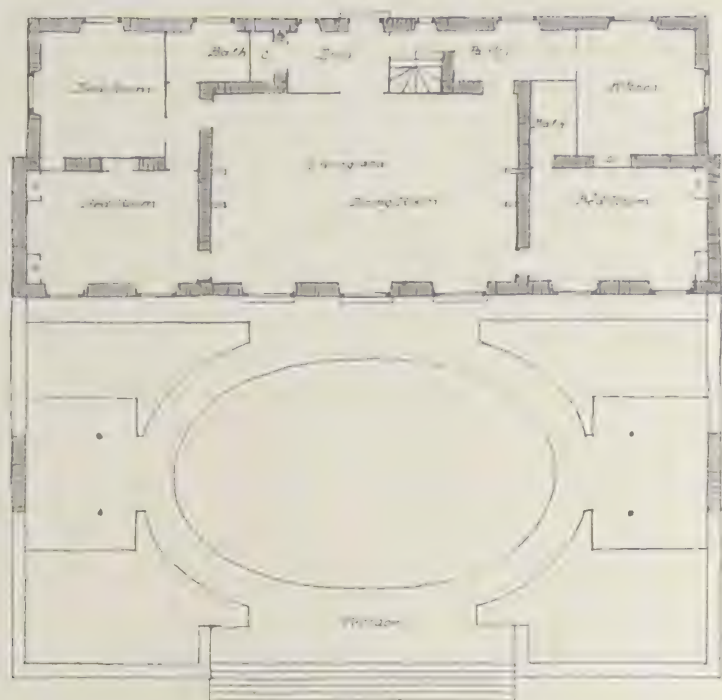
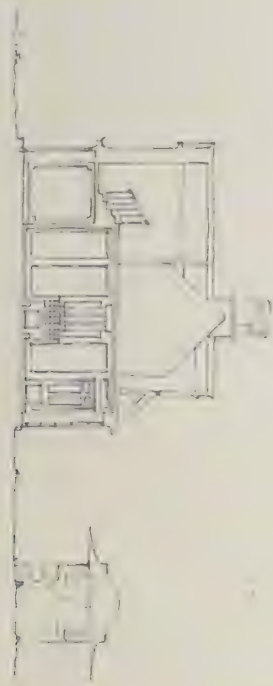
No. 45

Design for a grille by the author. Straight and curved lines contrasted.

* Paul Blondel, architecte du gouvernement pour la Louvre et les Tuilleries.

Table of Modules

1 m	= 3'-9"
2 "	= 7'-6"
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4 "	= 15'-0"
5 "	= 18'-9"
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12 "	= 45'-0"
13 "	= 48'-9"
14 "	= 52'-6"
15 "	= 56'-3"



SMALL HOUSES

that it is not so much the amount of ornamentation which counts, in producing a fine effect, as the manner of its use, and that skill counts for more than money in such matters.

Plate 47

Here there is one large room which serves for all living purposes; the dining-room is dispensed with. There are three masters' bed-rooms and two bath-rooms on the ground floor, and the servants' rooms and bath on the upper floor. The main door is reached by the servants from the pantry, without entering the living-room.

On the garden side the house is preceded by a low terrace, on which are two open shelters which take the place of a verandah. These are not shown with the main elevation, but appear with the side elevation and section.

Some people will doubtless object to the omission of the dining-room, while others will like the arrangement and prefer the one large room to two smaller ones. If a separate dining-room was wanted it could, of course, be had by simply cutting off one end of the large room by a partition.

The plan of this house, though compact, is somewhat extravagant of masonry, there being more walls than usual.



No. 46

College Sapienza at Rome. Michael Angelo, architect

STAIRS

THE stairs of these houses have not been standardized to the same extent as some of the other features which go to make up the building, because it is not always convenient to use the same form of stairs with every plan. More than one-half of them, however, conform to the detail Figure 1, of Plate 48, and most of the others follow it in the lower half, the upper half being straight.

It is very convenient to use winders in planning because they often save a great deal of room, but as generally made they are more objectionable than necessary. If properly designed they are suitable for private houses and other places where their use is limited to few people, especially if the story height is low. The secret of making good stairs of this kind lies chiefly in making the angle step so wide that it may serve as a sort of landing and a break in the run. Short stairs may properly be steeper than long ones. If the story height is 10' or more, the tread should not be less than one foot, nor the rise more than 6"; but in these houses, where the story heights are generally 8' at most, the treads are from 9" to 11", and the rise from 7½" to 8¼".

A sharp distinction should be made between spiral stairs and stairs having winders. In spiral stairs the treads of each flight are of uniform width, while in stairs having winders the widths of the steps vary in the same flight, they are therefore more dangerous than spiral stairs and altogether unsuitable for heavy traffic while spiral stairs, if properly designed, are not dangerous even for that kind of use.

There was a time when spiral stairs were very popular and deservedly so, for they have many advantages. For several hundred years they were in great vogue in Europe, but fashions change, often for no apparent reason, and spiral stairs are now seldom used.

Like many other old building methods once greatly esteemed, but now fallen into desuetude, this one has much to recommend it. Viollet-le-Duc says of them: "Ces sortes d'escaliers présentaient plusieurs avantages qu'il est important de signaler: 1° ils pouvaient être englobés dans les constructions ou n'y tenir que par un faible segment; 2° ils prenaient peu de place; 3° ils permettaient d'ouvrir des portes sur tous les points de leur circonférence et à toutes hauteurs; 4° ils s'éclairaient aisément; 5° ils étaient d'une construction simple et facile à exécuter; 6° ils devenaient doux ou rapides à volonté; 7° pour les châteaux, les tours, ils étaient barricadés en un moment; 8° ils montaient de fond jusqu'à des hauteurs considérables sans nuire à la solidité des constructions voisines; 9° ils étaient facilement réparables."

To this list he might have added that they may save a great deal of room in the elimination of corridors. Generally speaking, in the Middle Ages, by the use of these staircases, the communication in buildings was chiefly vertical, rather than horizontal, as at present. Modern staircases take up so much room and are so expensive to build that they are used sparingly, and to reach them from remote parts of the upper floors, corridors are generally necessary. By the introduction of one or more additional stairs, such corridors may often be dispensed with and the space saved used for other purposes, or the building reduced in size, but in order to effect such a saving the stairs must be of an economical type, and of all forms of stairs the spiral occupies the least space.

Since Viollet-le-Duc wrote, still another advantage has arisen

in the use of spiral stairs. The introduction of Portland cement has made it possible to cast the steps as concrete blocks, and at so little cost that what are virtually stone stairs may be had at no greater outlay than for wooden ones. This is especially true where one mold may be used over and over again. Figure 2 illustrates a form of stairs of this kind, which is advantageous because of its open newel. This permits of the passage of pieces of furniture of considerable size; renders an auxiliary balustrade on the newel side unnecessary; reduces the apparent steepness by cutting off the narrowest part of the tread; improves the appearance of the stairs by making them more open and graceful and by shortening the steps; reduces the material and makes them easier to handle during construction. In a stairs of this sort, where space is limited as in these plans, it is best to make the width as little as possible, even less than indicated on the drawing, because by so doing the average width of the tread is increased and the amount of material required for making the step reduced. As stairs 3' wide are too narrow for two people abreast, and as 2' 6" is wide enough for one person, there is no reason, except looks, for making the stairs of very small houses more than 30" wide.

In Figures 3 and 4, of Plate 48, are shown respectively the top and bottom of one of these steps. The horn-like projection at the end forms the sort of barrier around the open newel, as seen in Figure 2. These steps are to a great extent self-sustaining. If the blocks are properly laid in Portland cement, they need no other strengthening, although to guard against defective bedding it might be well, in casting the steps, to make provision for small dowel pins at the newel ends of the blocks.

Spiral stairs are not often indicated in these plans, but they might be substituted in many of the designs, with great advantage, for wooden stairs. Stone possesses great advantages over wood for stairs: *First*, it will not burn; *second*, it is more substantial both in appearance and reality; *third*, it is more enduring and stands less in need of repair; *fourth*, it requires no paint; *fifth*, stone stairs are better looking, and if to this may be added that they cost less to make, the reasons for their use would seem conclusive.

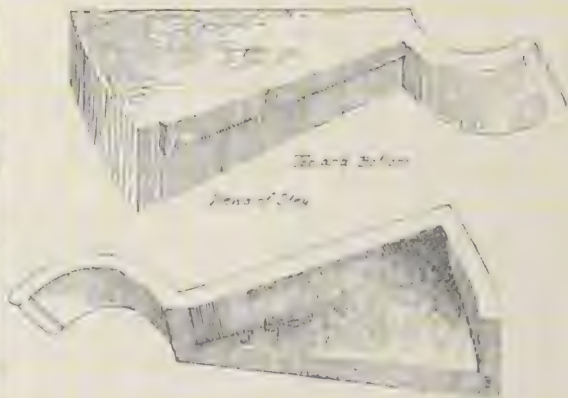
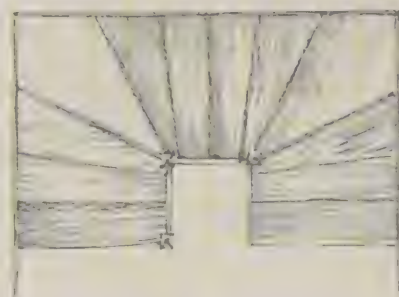
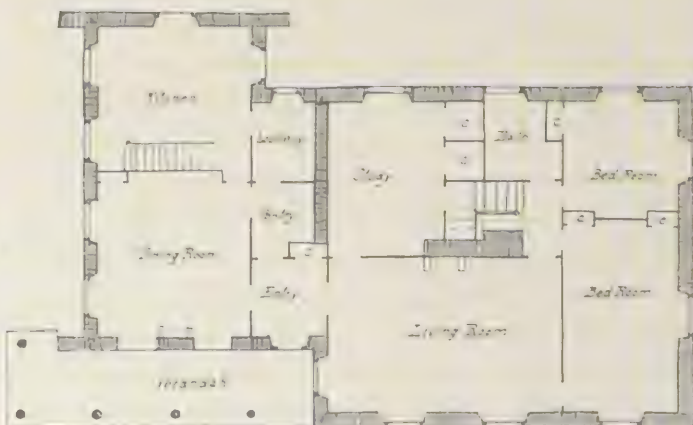
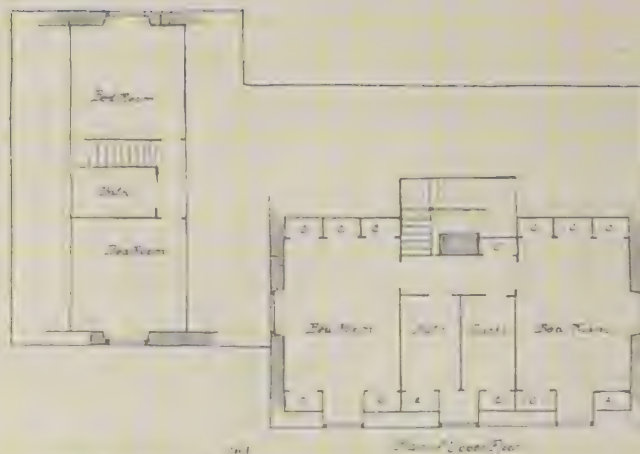
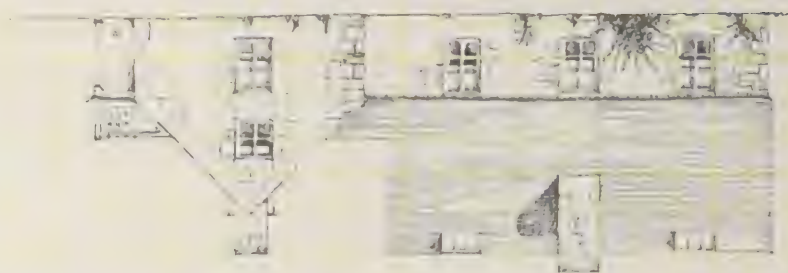
The chief difficulty in constructing such stairs lies in making the forms, but these are few, and when once made may be used indefinitely. For stairs of the sort indicated in Figure 2, one form serves for all the steps except the bottom one, and only two forms are required for the blocks of the enclosure wall.

Plate 48

The distinguishing feature of this house is the lean-to at the rear, containing one bed-room, a bath-room, and the study. Unlike many of the plans, the chief entrance to the house is not in the center of the main part of the building. Except for appearance, the center of the main part is generally a bad place for the entrance, unless the hall runs through the house, as in the typical plan of Colonial times, which plan is extravagant of hall space, as compared with these. Here the dining-room and entire service department of the house is in the wing, leaving the main body of the building entirely free for family use. The house has a very abundant supply of closets, of which there can never be too many. The perspective view of the living-room shows one of the standard beam ceilings (see Part XXX). The general appearance of the house, both inside and out, is intended to bespeak simple homely comfort.

Table of Modules

1 m.	-	3'-9"
2 "	-	7'-6"
3 "	-	11'-3"
4 "	-	15'
5 "	-	18'-9"
6 "	-	22'-6"
7 "	-	26'-3"
8 "	-	30'
9 "	-	33'-9"
10 "	-	37'-6"
11 "	-	41'-3"
12 "	-	45'
13 "	-	48'-9"
14 "	-	52'-6"
15 "	-	56'-3"



OPEN-AIR SHELTERS

IN the country and even in suburban districts an outdoor shelter of some sort is an essential feature of the American home. It usually takes the form of a verandah attached to the house. Rooms in the lower stories of many houses are rendered gloomy by these contrivances. On dark days, when light is most needed in the house, the effect is the worst, and in winter and at other times when the verandah cannot be used with comfort, its depressing shade is most felt indoors. It is certainly a great mistake to cover all the windows of any room with a verandah roof. If the verandah must be attached to the house, then it should be so contrived as to pass before such rooms only as have windows on two sides, so that those of one side at least may be free from it. A good plan is to attach the end of the piazza only, keeping the sides free; for that makes both the house and piazza more open and cooler, and interferes less with the light of rooms.

In this country the verandah serves somewhat the same purpose as the garden does in France and some other parts of Europe; it constitutes the outdoor home of the family. Here, the home outdoor life is spent chiefly on the piazza, while in France it is spent chiefly in the garden. It would seem that the French way is the more logical, for the shade of verdure and the proximity of plants is certainly more grateful to the senses than a piazza floor and the walls of a building, but the veranda roof serves a useful purpose in protecting furniture and also makes it possible to be outside even in rainy weather.

In several of these designs, the attempt has been made to secure the good in both of these methods and avoid their drawbacks by substituting for the verandah little outbuildings or roofed summer houses in the garden, but close to the house (see Plates 14 and 47). The designs on Plates 4, 5, 25, 26, 33, 34, 35, 37, 40, and 42 are supposed to have shelters of this sort, though for want of space they are not always indicated on the drawings. These little summer houses, if surrounded by a pavement of some sort, well-shaded by verdure, need not be large, for they are then primarily intended for the protection of such furniture as would be damaged by wet. Their cost would generally be less than that of a verandah, they would not darken the rooms of the house and might serve more effectively as decorative features. Such an arrangement lends itself well to these designs, for the walls of the house are in many cases so low that it is often hard to find a place for a verandah against one.

Another arrangement, which may be placed midway between the ordinary verandah and the detached summer house, is the uncovered terrace alongside the building, but this has the disadvantages that it affords no protection for furniture, no shade except that of the walls of the house, and is not suitable for use in wet weather. These difficulties may be overcome by providing a small shelter, simply large enough to hold the furniture when not in use (see Plate 16), and awnings which fold up. The houses on Plates 10, 12, 22, 32, and 43 are supposed to be so equipped. The outdoor furniture in these cases, must, of course, be of a kind which will stand wet. Where the terrace is used in this way, as a place to sit, it should be so arranged that some part of it will be in shade at all times of day. Trees may, of course, be used to provide shade; but this has the inconvenience that they may make the house gloomy.

If the best sanitary results are to be expected, the house should bask in the sun all day; no tree should at any time cast a shadow on it.

Perhaps the most satisfactory plan that can be adopted is to make the shelter semi-detached, as illustrated in Plate 9. Such an arrangement is free from all the objections which might be raised either to the ordinary veranda, the open terrace, or the detached summer house.

When sitting outdoors it is always pleasant to be raised somewhat above ground both because it extends the view and affords a certain feeling of privacy. Perhaps this is why terraces are so pleasant. In several of these designs an attempt has been made to secure this desideratum by making use of the roof of the lower story to form a terrace. The idea is illustrated on Plates 12, 32, and 49, also on Plate 39, where the sleeping-porches are intended to be used in the day-time as verandahs. In several of the designs the conformation of the land has been taken advantage of to obtain elevated outlooks for the verandahs (see Plates 7, 14, 17, 35, 36, and 44).

In the essay on Topiary it is explained how beautiful, natural shelters of verdure may be had at little trouble or expense by the planting and clipping of trees. Such shelters are, in several respects, much to be preferred to pergolas but require more time to make. The pergola is not an economical feature. Frequent painting is required to preserve it, and this the vines, with which it is supposed to be covered, make difficult.

Where circumstances will permit, the old French custom of having a grotto, or *salle fraîche*, is most delightful. Such a place may easily be contrived where there is a hill or bank near the house. To make one it is only necessary to dig away a part of the bank, turn an arch (taking care to damp-proof the top), then cover it over with earth, leaving only one side open. Shade, about such a grotto, should be obtained by trees or other dense foliage. The pavement of the grotto should be extended out in front of it, for it is often pleasanter to sit just outside than inside a grotto. Cushions and such other furniture as might be damaged by rain may be protected, when not in use, by the grotto. Shelters of this sort may be contrived, even in places where there is no bank or hill, by making a mound over the arch and concealing it with shrubbery or trees.

During the eighteenth century the French were prolific in con-



No. 47
An outdoor room. French XVIIIth century.
See Part II.

SMALL HOUSES

triving all sorts of outdoor adjuncts to their châteaux. A favorite arrangement was to make rooms of verdure, open to the sky, carpeted with turf and having walls of clipped yews (see Photograph 47). Such places constitute delightful retreats and are by no means either hard or expensive to make, if of moderate proportions, for nature herself does the building and one has simply to exercise patience and care in directing the work (see Topiary, Part LI). The French added much to the interest and beauty of this kind of architecture by the use of statuary, vases, and similar ornaments. But one hesitates to recommend that kind of treatment here for fear the sculptured embellishments might be of a kind too common in this country and so serve to detract rather than add to the beauty. Water is a safer form of decoration. Fountains, jets, and pools are peculiarly appropriate to such places, and when they can be had, even on the most modest scale, should by all means be used.

In all matters of this sort the prime requisite is forethought. By the use of forethought all sorts of delightful adjuncts to the house may be had, and often at no greater trouble or expense than is devoted by many in acquiring the prosaic and commonplace.

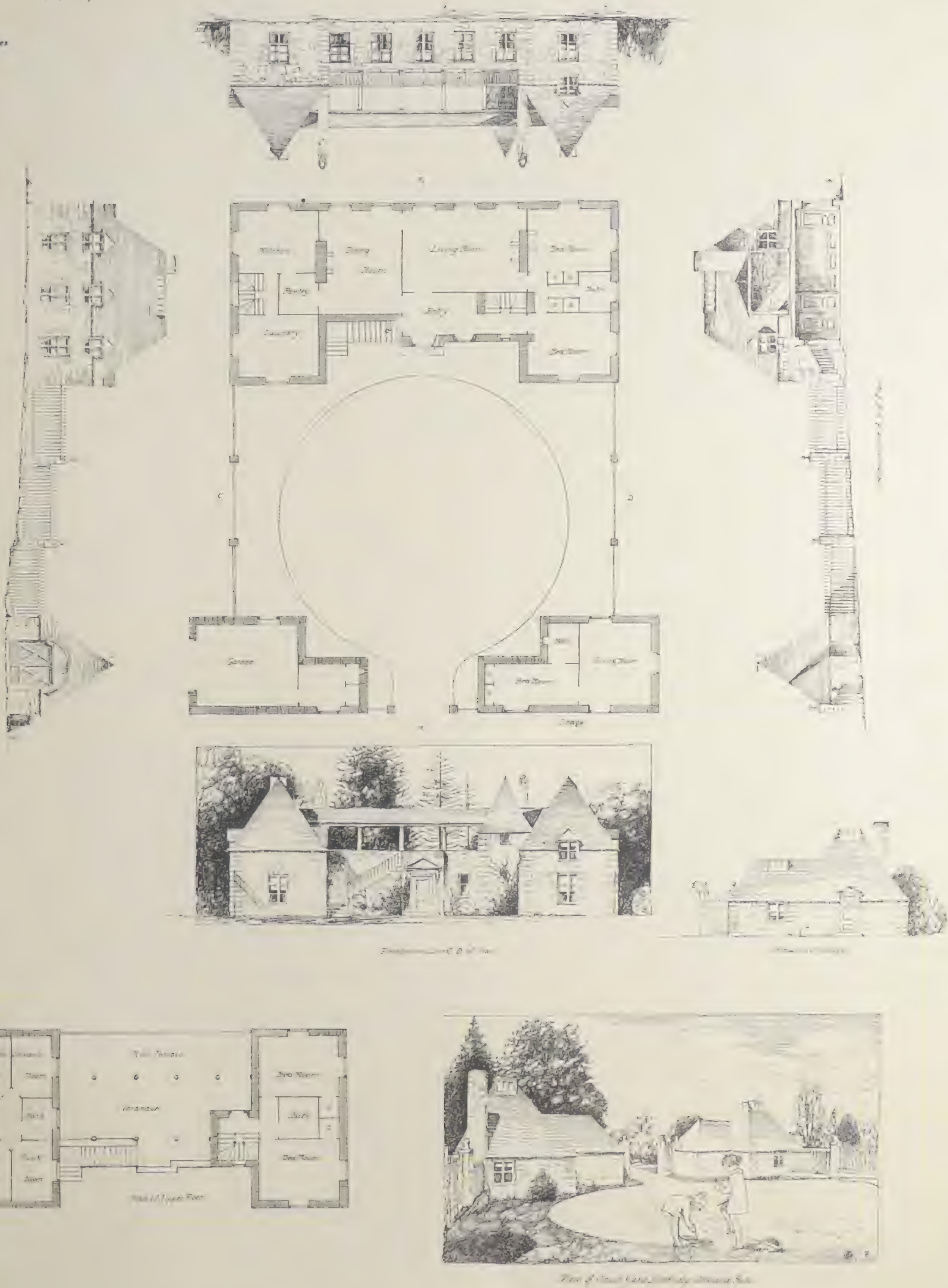
Plate 49

Here, as in several others of these designs, the attempt is made to obtain elevation for the verandah by placing it on the roof of the lower story. Elevated in this way the verandah would, for many people, be more attractive than at the ground level. In this case it may be reached either from inside or outside the house. A flight of stone steps gives access to it from the court. The roof of the whole central part of the house forms a terrace, of which about one-half is covered by a verandah roof. This house, like many of the others, has four masters' bed-rooms, placed in two pairs, each pair having a bath-room and ample closets. These rooms occupy the right wing of the building as one faces it from the court. The left wing is entirely occupied by the service department. The living and dining rooms are placed in the central part of the building and their windows overlook the garden beyond the court.

Two small buildings stand at one end of the court, and the main gateway to the court is between them. One of these is a garage and the other contains living quarters for use according to the needs of the family which occupies the main house.

Table of Modules

1 m	-	3'-0"
2	-	7'-0"
3	-	11'-3"
4	-	15'
5	-	18'-0"
6	-	22'-0"
7	-	26'-3"
8	-	30'
9	-	33'-9"
10	-	37'-0"
11	-	41'-3"
12	-	45'
13	-	48'-9"
14	-	52'-6"
15	-	56'-3"



SYMMETRY, ORDER, AND BALANCE*

IN the essay on Design an attempt was made to classify some of the most important qualities, relating to the subject, under two heads: desirable and essential—the desirable ones being those which most clearly reflect the personality of the artist; and the essential ones those which every design should have, and without which it cannot properly be regarded at all as a work of art.

Some qualities there are which can hardly be classed in this way. Symmetry, order, and balance seem to be of that kind, for it is possible to conceive of a design in which they are absent, but which may still be a work of art. On the other hand, while the possession or lack of symmetry, order, or balance may be strongly indicative of the character of the artist, yet those qualities cannot be regarded as personal in the same sense as interest, simplicity, dignity, refinement, and style are personal, and this even though symmetry, order, and balance may be the very means by which those other qualities are obtained.

Some designs are called symmetrical and some unsymmetrical, yet there is usually some symmetry in every design. There may be symmetry in the parts, even when it is lacking in the general composition. The most picturesque mediæval building, which in its main outlines may be entirely devoid of symmetry, generally has more or less in the arrangement of its parts.

Symmetry is such an important element in design, that at first thought it might seem essential. It is hard to think of a design totally devoid of symmetry, certainly no important composition can be altogether without it.

The immense value which symmetry or balanced repetition, which is really the quality here referred to, may have in design is strikingly illustrated in the kaleidoscope. In that instrument a few bits of colored glass fall from side to side as it is turned. Those particles arrange themselves haphazard in fashions which, if considered without symmetry, have no value or design, yet because the arrangement is reflected symmetrically all sorts of interesting and sometimes beautiful patterns are produced. This same effect is seen in the glorious rose windows of the thirteenth century, which are hardly more than kaleidoscopic arrangements of bits of colored glass. The glass is in small fragments leaded together, forming designs, it is true, but very little dependent on those designs for its effect. The stone tracery and iron bars of the supports give symmetry to the composition which results in effects of surprising beauty.

Symmetry is, therefore, of the greatest assistance to the designer. By its use objects, which in themselves are of little consequence, may be made of great importance in a composition. Two little outbuildings, for instance, if symmetrically placed at either side of a small house, may combine with the house in the formation of a composition possessed of dignity out of all proportion to the objects composing it when considered separately. Fences, arbors, trellises, and even trees and bushes may be used in this way. Therefore, it is of the highest importance that the designer of small houses should be fully alive to the resources which he has at his command by the use of symmetry. When one has little to work with, it is essential,

* Symmetry is here used in a narrow sense, meaning simply the repetition of one half the composition, in reverse order, by the other half.

if the best results are to be expected, that he should understand how to make the most of what he has—in other words, to be acquainted with the principles of design, of which symmetry is an important element.

The design of the human figure teaches us that the best results are obtained by the use of symmetry in contrast with asymmetry. Front and rear the human form is symmetrical, but the sides are not so.

It is quite possible to have too much symmetry, too much order, but hardly too much balance. Beyond a certain point, symmetry palls. The beauty of symmetry is heightened by contrast with the lack of it, or what the Greeks called *asymmetrea*. May it not have been for this reason that they, with their unerring instinct for beauty, arranged their symmetrical buildings unsymmetrically? There is a beauty in symmetry and a beauty in picturesqueness. Did they not aim at both?

The Acropolis at Athens and the agora at Olympia, the heron at Epidaurus, and, one may say, every sacred Greek enclosure of the kind, was almost wildly unsymmetrical in its arrangement, yet filled with monuments in which symmetry was a most distinguished characteristic. Symmetry with picturesqueness is certainly more interesting than symmetry without picturesqueness. The latter is apt to be stiff, cold, and repellent in its formality. On the other hand, picturesqueness without symmetry lacks an intellectual quality which places it in a lower sphere than where symmetry also is found. The truth of this is seen in the fine effects which French architects know so well how to obtain by the use of topiary and other formal treatment of grounds about buildings, which contrast with and intensify the picturesque beauty of the natural landscape beyond.

Order is an intellectual quality. It is an attribute of man alone, one of those qualities which distinguish him from, and elevate him above, the rest of creation. Order in design should appeal to our reason and, if well applied, excite our admiration. Order is closely related to symmetry and balance, but is a thing apart from either though included in both.

The presence of order indicates the exercise of intelligence. Order in a community indicates civilization, and the degree of civilization may be gaged by the degree of order. The orderly arrangement of the streets and buildings of a city, for instance, is a gage of the extent and quality of art and refinement which the community possesses. The care, reasoning, and forethought which such order shows, indicate to what extent intelligence, taste, and other qualities of the higher sort have been used. These are qualities which become pronounced in proportion as we progress from the savage to the civilized state.

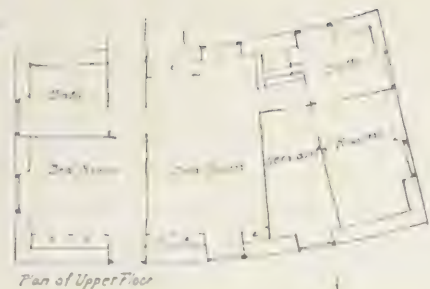
Weighed in this balance, American cities, as a rule, rank low. In them, on every hand, it is painfully apparent that material considerations generally outweigh the higher intellectual ones on which refinement depends. Many here will doubtless indignantly deny this charge, but no one can truthfully deny that this is the general impression produced on the minds of most cultivated foreigners who visit us, and nothing is to be gained by denying what is plainly

Houses for the Flegg Ridge Estate of Ernest Flagg at Dongan Hills, S. I.

No. 50

Table of Modules

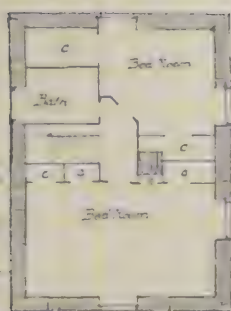
1 m - 3'-9"
2 " - 7'-6"
3 " - 11'-3"
4 " - 15'-0"
5 " - 18'-9"
6 " - 22'-6"
7 " - 26'-3"
8 " - 30'-0"
9 " - 33'-9"
10 " - 37'-6"
11 " - 41'-3"
12 " - 45'-0"
13 " - 48'-9"
14 " - 52'-6"
15 " - 56'-3"



Plan of Upper Floor



FIRST FLOOR



Plan of Lower Floor



SMALL HOUSES

apparent to every one but ourselves. On the other hand, much may be gained by a knowledge of the truth.

Balance, in design, is closely related to symmetry and order, but is a thing apart from either, though it may be included in both. To a greater extent even than symmetry, balance might be considered an essential quality in design. Without balance a design is certainly defective, though the defect may not be sufficiently great to exclude it from classification as a work of art.

It is very hard to define any quality of art independently of other qualities, for they are so interwoven and blended together that one cannot say where this quality begins or that one ends. Many qualities are included in other qualities, and some are obtained largely by the use of other qualities, as dignity by simplicity, order, balance, symmetry, repose, and perhaps many more. Balance has intimate connection with what we have called certainty in design, but the present purpose is simply to explain the meaning here attached to the various terms used. The human form is the very personification of this quality, for it is always in balance, regardless of any position or attitude it may assume. The meaning of balance, without symmetry, may be seen in almost any well-designed ornament in what is called the style of Louis XV.

Plate 50

House A was built at the side of the road on an old retaining wall, and as the wall bends with the road the house bends too. Back of the wall the land rises and the house accommodates itself to the slope. The principal part of the building, in the form of an irregular rectangle, contains two stories above the basement. On the ground floor are the living-room and dining-room, and on the first floor two bed-rooms and a bath-room, besides the servants' quarters—also of two bed-rooms and a bath-room. Two more masters' rooms and another bath-room occupy the wing, the floor of which is about midway between the ground and first floors of the main part of the house. The kitchen is in the basement.

This house might well serve as an illustration for the essay on Topography. It has the same appearance of belonging to its site which one often sees in old buildings of Europe. Nor is this strange, for it was planned on the spot and fitted to the site. The machine-made air, so often characteristic of houses designed with reference to no particular site, and capable of being placed almost anywhere, is here entirely missing. Instead of which the building has about it a certain individuality which seems to belong with the site, and to be at home in its surroundings (see Photographs 48 and 49).



No. 48

House on old retaining wall which bends with the road.



No. 49

"Bowcot" from the west.

TOPIARY

THE status of topiary in the field of art is peculiarly dependent on the way it is used. Under skilful guidance it may become an important adjunct of architecture, and in other hands sink altogether below the horizon of art.

In England, at present, topiary is not much used, except for the smaller plants and shrubs. During the eighteenth century it was in great vogue, but as a fad rather than an art. It appears to have been exclusively in the hands of the gardeners, who used it according to their lights. They acquired a truly marvellous technical skill, but the higher possibilities of the art were undreamed of by them. Unrestrained by other guidance than their own taste or whim, they gave to the trees any form that fancy dictated, with



No. 50

French topiary. Carrying the architectural lines into the country.

results which were generally amusing rather than beautiful. Tortured into all sorts of curious shapes the plants became mere objects of curiosity, having little or nothing to do with any decorative scheme or design for the grounds. It is not surprising, therefore, that the taste for that sort of thing should have died out.

In France conditions and results have been different. There the art has always been under the direction and control of the master designers, who have used it as a powerful agent in obtaining grandiose and beautiful effects. By its aid the architect is enabled to merge his buildings into the landscape, to marry one to the other, so to speak. By means of it he may greatly extend the lines of his general composition and thus obtain a degree of magnificence, combined with beauty, which can be had so well in no other way. Some of these effects are surprising in their splendor, and can scarcely be conceived of by one unacquainted with them. Thus used as an adjunct to architecture, topiary becomes an art worthy of respectful consideration.

The tree most generally employed for this purpose in France is the *orme* (elm), but almost any kind will answer. Quick-growing trees, however, require too much clipping to keep them in shape and should be avoided. Trees planted in double rows, and clipped true and square on top and sides, make the most perfect arbor imaginable, under which one walks in a bower of the densest verdure.

Aisles of old *ormes*, such as one often finds near the palaces, châteaux, and in many of the public gardens of France, and which form an integral part of the general design or scheme of building or decoration, must excite admiration in any but the most confirmed purist (see Photographs 50 and 51).

Topiary is an art which might well receive more consideration in this country than it does. Its possibilities are not generally understood (see Photograph 52). Except for hedges and borders one sees practically nothing of it here. Yet many would gladly avail themselves of its benefits if the matter were but brought to their attention.

The practice of this art would prove a very interesting pursuit for the amateur. Thousands of people who enjoy a little light, outdoor work near the house, might find in it a most agreeable and profitable occupation for leisure hours, if they knew how to go about it, while thousands more would perform the necessary labor for the accruing benefits. They would gladly have the delightful natural bowers and verdure-clad shelters which might be so easily had at little or no cost except for some interesting labor which they themselves could perform.

At the start nothing more is needed than a few saplings. These may be set out in a double row, with the idea of obtaining an aisle, or in the form of a square, circle, or any other pleasing geometric figure. After the trees are started one or two clippings a year will keep them in shape and time will do the rest, for nature does the building and man has simply to direct the operation.

There is only one prerequisite for success, viz., carefully prepared guide-lines for clipping during the first years of growth. The plan recommended by the writer is to establish such lines by means of wooden uprights with wire strung between, giving the outline of the proposed arbor or bower, as it should be when completed. When the trees have assumed their definite form, these may be removed, for then no other guide will be needed than the trees themselves. About twice a year all shoots or twigs which grow beyond the limits set should be clipped off, and for each one so clipped two or more others will come in its place, so that in time the surfaces will become dense and thick like a hedge.

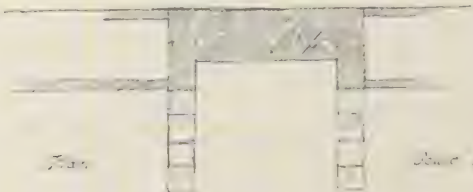
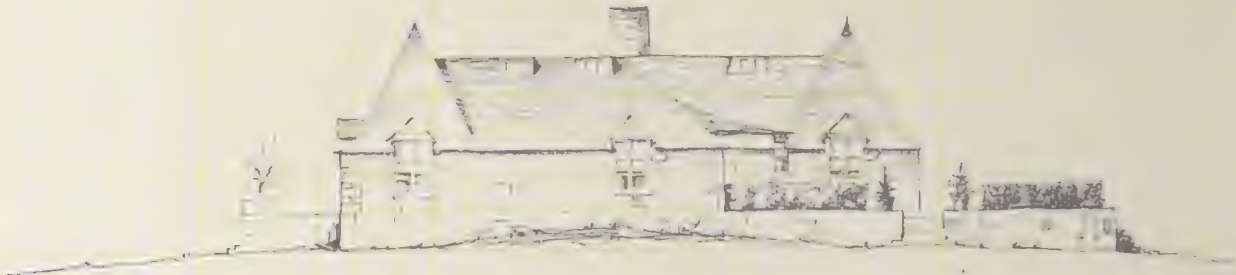


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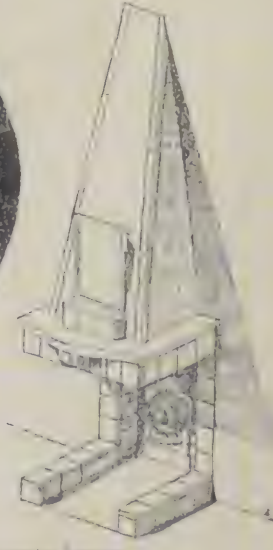
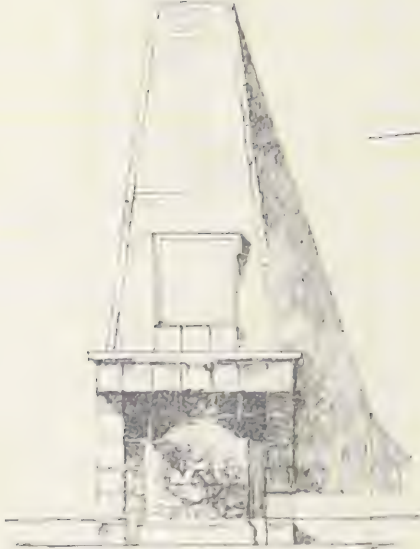
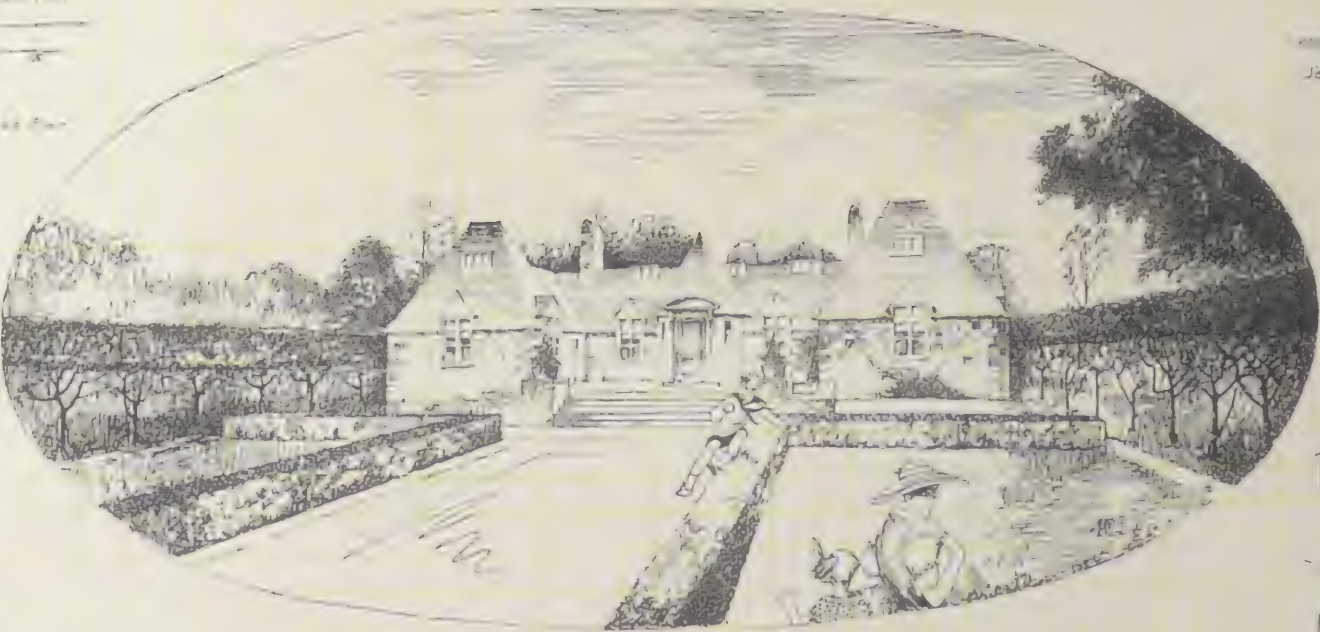
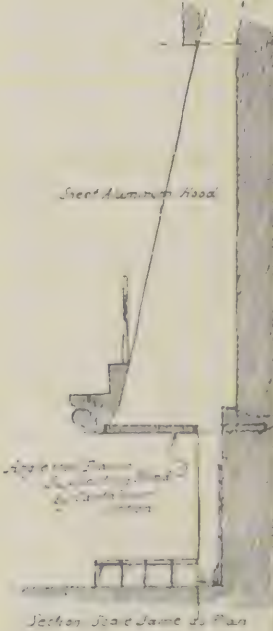
Parterre Château de Champs, France.

Table of Modules

1	m	=	3'-0"
2		=	7'-0"
3		=	11'-3"
4		=	15'
5		=	18'-0"
6		=	22'-0"
7		=	26'-3"
8		=	30'
9		=	33'-9"
10		=	37'-6"
11		=	41'-3"
12		=	45'
13		=	48'-9"
14		=	52'-6"
15		=	56'-3"



THE PLAN of Living Room



SMALL HOUSES

Features of this sort are as appropriate to small places as to large ones, for the man in moderate circumstances as for the rich. As a means of increasing the importance of a building nothing is so effective in proportion to the outlay as topiary. By its use, at slight cost, a grand air may be imparted even to a very humble house, or the beauty, interest, and dignity of a fine one greatly enhanced.

In France there are concerns which make a business of tree-clipping, and it would seem as if an abundant field for the establishment of such an industry might easily be cultivated here. Surely very little education should create a demand for an art having so much to recommend it.

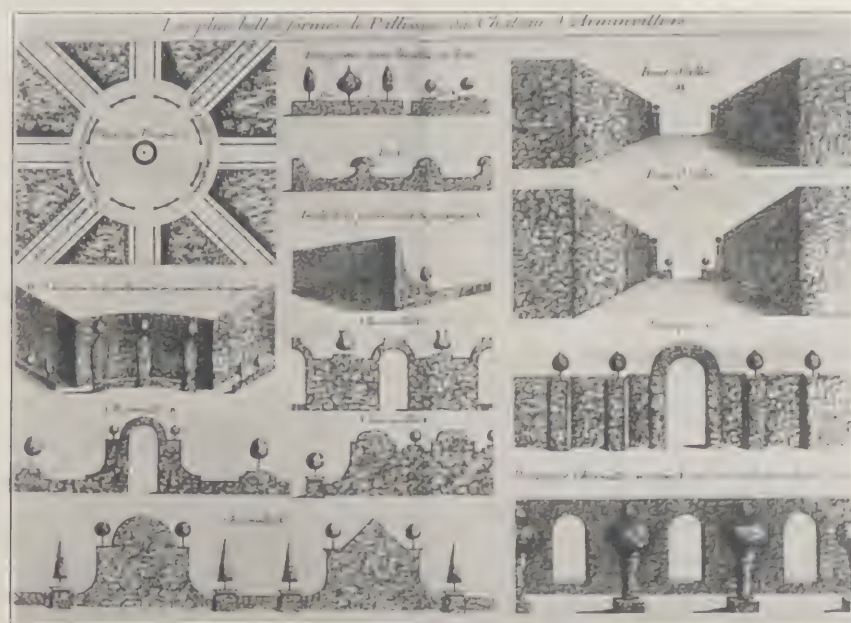
Plate 51

This design illustrates how topiary may be made to contribute to the fine appearance and importance of a house, no matter how small. Here, two simple lines of clipped trees impart to the build-

ing an air of distinction which could hardly be obtained in any other way at so little trouble and expense. The result is certainly out of all proportion to the means employed in obtaining it. It gives to the small house a touch of that grandiose air which the French architect obtains by similar means for his palatial constructions, yet there is nothing about it which conflicts with propriety or offends taste. The treatment merely stamps the place as the abode of refinement.

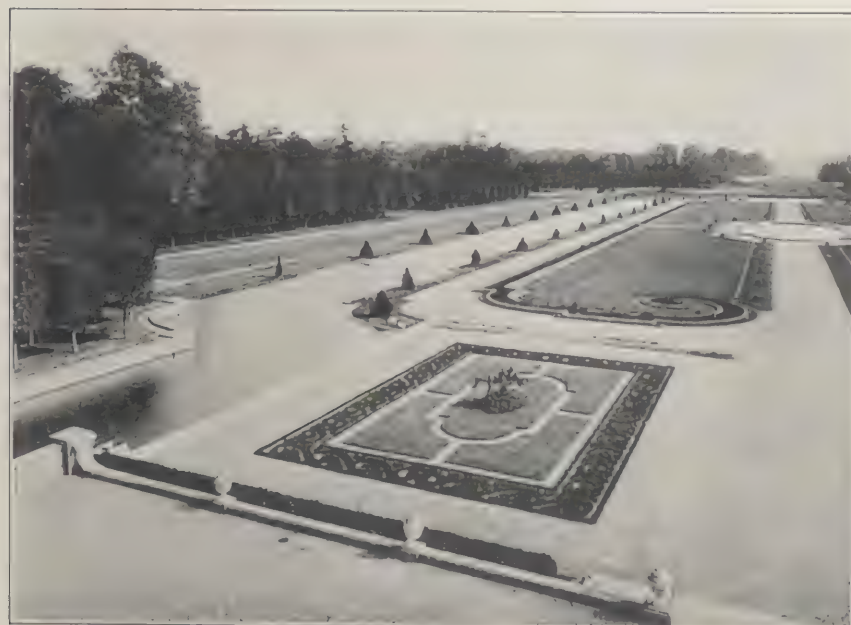
The building is a one-story house to which variety is imparted by accentuating the three corner pavilions in giving their roofs greater pitch. In these pavilions the ceilings of the rooms do not follow the slopes of the roofs, but are placed at a height of about 8', there being an opening in each case to the loft thus formed, which opening is supposed to remain open during hot weather, so that benefit may be had of the ridge-dormers.

On account of the uniform lowness of its walls, this house should be economical to build.



No. 52

French XVIIIth century topiary.



No. 53

A typical French formal treatment of grounds about a house.

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